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July 25, 2008

MEMORANDUM

SUBJECT: Section 3 Request for Additional Uses of Emamectin Benzoate (PC Code: 122806); Insecticide Product Proclaim® (EPA Reg. No. 100-904) for Tree Nuts (Group 14) and Pistachios

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Attached please find the Environmental Fate and Effects Division's (EFED) environmental risk assessment for the proposed new uses of emamectin benzoate as an insecticide on tree nuts, pistachios and almond hulls. This risk assessment covers one formulated product, Proclaim® Insecticide, a water-soluble granular product. The proposed maximum labeled application rate for tree nuts and pistachios depend on the degree of infestation of the target pests. The label recommends an application rate of 3.2 oz (0.01 lbs a.i./A) for low to moderate infestations and 4.8 oz (0.015 lbs a.i./A) for severe infestations. Multiple applications are allowed with a 7-day interval up to the maximum seasonal load of 14.4 oz (0.045 lbs a.i./A). Emamectin benzoate can be applied via ground, air blast, or air. The application rates for the proposed new uses are the same of the registered uses on pome fruits. The application methods for the proposed new uses are ground and air blast applications while aerial applications are not permitted. Consequently, this risk assessment mainly focuses on the maximum application rate of 0.015 lb a.i./A applied three times via air blast with 7-day reapplication intervals to assess if emamectin benzoate poses additional risks to other taxonomic groups not identified in previous risk assessments. The risk conclusions based on the minimum application rate of 0.01 lb ai/A applied 4 times with 7-day reapplication intervals via ground or air, three ground applications at 0.015 lb ai/A with 7-day reapplication intervals, the problem formulation, conceptual model and analysis plan can be found in the previous assessment on pome fruits (D309154).

Key findings of this risk assessment are as follows:

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To comply with Agency's current standards, there is an additional risk identified in this risk assessment for the proposed uses on tree nuts and pistachios. Potential risk to terrestrial plants is identified this time because toxicity data are not available; the potential risks to terrestrial monocots and dicots cannot be precluded at this time and assumed directly affected until data indicate otherwise. For other taxonomic groups assessed, the risk conclusions in this assessment for emamectin benzoate applications on tree nuts and pistachios are mostly identical as of the registered use on pome fruits (see D309154). The most notable change in this assessment is that the chronic risk level of concern was not exceeded for freshwater invertebrates. Since the chronic LOC was not exceeded from air blast applications, EFED expects no LOC exceedance of chronic risk to freshwater invertebrates from ground applications because EECs resulting from ground applications are lower than air blast applications. Therefore, emamectin benzoate treatments on tree nuts and pistachios are not anticipated to effect reproduction, growth, or survival of young of freshwater invertebrates when exposed to the insecticide via ground or air blast applications.

Similar to pome fruits, the proposed emamectin benzoate uses on tree nuts and pistachios pose risk at the Agency's LOCs to birds, reptiles, terrestrial-phase amphibians, mammals, and aquatic invertebrates and concerns for terrestrial plants. EFED also presumes that insects and arachnids located in the area of emamectin benzoate applications are at risk since emamectin benzoate is an insecticide. New uncertainties were not identified in this assessment; however, uncertainties from previous assessments have not been addressed. Principle among these is that risk to birds and mammals may have been underestimated because emamectin benzoate has been shown to induce neurotoxic effects that could result in decreased survival at sublethal doses. The acute risk assessment, however, was based on lethality, which occurred at higher exposure levels, because the neurotoxic effects could not be quantitatively related to survival or reproductive success.

There were no acute or chronic LOC exceedances for fish, aquatic-phase amphibians and aquatic plants, and the chronic LOC was not exceeded for freshwater invertebrates.

Uncertainties and data gaps are summarized in Table D of this assessment. Data gaps include studies in sediment dwelling organisms, lack of an acceptable life-cycle study in mysid shrimp, more sensitive analytical detection methodology, terrestrial plant toxicity data, and degradate toxicity data. See Table D in this assessment for additional details.

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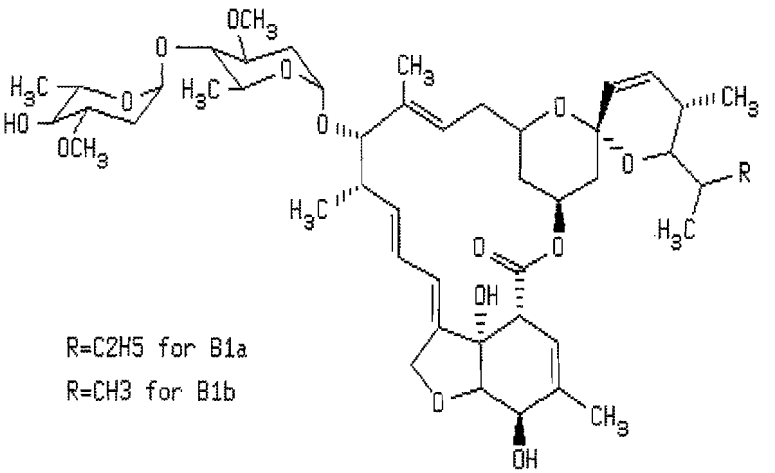
Environmental Fate and Ecological Risk Assessment for the Registration of Emamectin Benzoate Use on Tree Nuts and Pistachios (New Use)

PC Code 122806



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I. EXECUTIVE SUMMARY

A. Nature of Chemical Stressor

Emamectin benzoate (Proclaim®) is an avermectin class insecticide developed for the control of lepidopteran insects. This class of pesticide consists of homologus semi-synthetic macrolides that are derived from the natural fermentation products of *Streptomyces* bacteria. It kills insects by disrupting neurotransmitters, causing irreversible paralysis. It is more effective when ingested, but it also somewhat effective on contact. Target pests are numerous and include various moths, leafrollers, fruitworms, and caterpillars.

Emamectin benzoate is currently registered for use on fruiting vegetables, brassica head and stem vegetables, leafy vegetables and pome fruit. Current end use products include an emulsifiable concentrate (Proclaim 0.16 EC). It is applied via ground, air, or as a spray blast.

The Agency has identified four degradates of concern based on structural similarity to emamectin benzoate (see p. 5-6 for additional discussion on the degradates):

- (8,9-Z0-4"-epimethylamino-4"-deoxy avermectin B1 (8,9 ZMA isomer);
- 4"-epiamino-4"-deoxyavermectin B1 (AB);
- avermectin B1 monosaccharide (MAB); and
- 4"-epi-(N-formyl)-4"-deoxyavermectin B1 (FAB)

All of these degradation products form via photolysis of emamectin benzoate. This assessment considers exposure to emamectin benzoate and all degradates of concern.

B. Previous Ecological Risk Assessments Conducted by EFED

EFED conducted a new chemical review in 2000 (D226628), two new use reviews in 2002[1], several Section 18 reviews[2], and a new use assessment for pome fruits in 2005[3]. New chemical assessed use patterns (application rate, interval, method) are lower than those proposed for the new uses on tree nuts and pistachios. Current risk conclusions are mostly identical to those presented in the previous assessment for emamectin benzoate use on pome fruit. The principle risks identified previously include risk to estuarine/marine and freshwater invertebrates and herbivorous/insectivorous mammals and birds, including terrestrial-phase amphibians and reptiles at levels of concern (LOC) to the Agency. Potential risk to insects is identified as a concern to the Agency in these assessments. Terrestrial plants toxicity data were considered a data gap in previous assessment; however, to comply with Agency's current standards, the risks to terrestrial plants cannot be precluded at this time and assumed directly affected until data indicate otherwise.

[1] DP Barcodes 279840 and 279841 (cole crops, leafy vegetables, cotton, and tobacco).
[2] DP Barcodes include D223875, D223876, D239671, D239672, D255357, D279840, and D279841.
[3] DP Barcode 309154 (pome fruit).

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C. Conclusions – Environmental Fate Characterization

After emamectin benzoate enters the terrestrial environment, it is generally expected to dissipate relatively quickly (days to weeks), primarily from photolysis. However, if it gets incorporated into the soil or is attenuated from light as is expected for proposed use on tree nuts, then it may persist because it is resistant to other forms of degradation such as microbial metabolism and hydrolysis. Emamectin benzoate's low Henry's law constant and vapor pressure indicate that little of the chemical is expected to enter the air from soil or water. Due to its high adsorption to soil, emamectin benzoate is expected to typically enter surface water via soil erosion and will likely partition to the sediment when it enters water bodies. Due to its slow microbial degradation, emamectin benzoate may persist in the sediment after application if it is attenuated from light. Emamectin benzoate also possesses the potential to slowly leach to ground water, where it is expected to be stable.

D. Conclusions – Environmental Exposure Characterization

Based on emamectin benzoate's fate profile described above, exposure to terrestrial animals will likely occur principally from consumption of contaminated foliage. Emamectin benzoate penetrates the leaf tissue and forms a reservoir within treated leaves, which provides residual activity against foliage-feeding pests that ingest the substance when feeding. This may also result in increased opportunity for exposure to *non-target* animals that consume treated leaves. Emamectin benzoate concentrations on selected food items were estimated to range from 0.37 to 6.0 mg ai/kg based on the maximum application rate for severe infestation (0.015 lbs ai/A; 3 applications). These calculations are based on a foliar dissipation half-life of 6.2 days and assume an application interval of 7 days. Given its persistence under some environmental conditions, there is potential for prolonged exposure. Emamectin benzoate's low vapor pressure suggests that inhalation exposure will likely be minimal. Its physicochemical properties suggest that emamectin benzoate is unlikely to absorb through the skin to any appreciable extent.

Aquatic animals may be exposed when emamectin benzoate or its degradates enters the water via surface water runoff, off-site spray drift or soil erosion. Based on emamectin benzoate's expected propensity to bind to sediment, sediment-dwelling animals may be exposed to emamectin benzoate at higher levels than animals that reside in the water column. However, emamectin benzoate's solubility is sufficient to allow for toxic concentrations to occur in the water. Aquatic EECs were calculated using the PRZM/EXAMS model. Peak, 21-day and 60-day surface water concentrations were estimated at up to 0.168, 0.048 and 0.045 µg/L, respectively.

E. Conclusions – Ecological Effects Characterization

Emamectin benzoate is highly toxic to fish (LC_{50}s range from 174 to 1430 µg ai/L) and very highly toxic to aquatic invertebrates (EC_{50}/LC_{50}s range from 0.04 to 490 µg ai/L) after acute exposures. Chronic emamectin benzoate exposure affected larvae survival and fish growth at concentrations between 6.5 and 12 µg ai/L in fathead minnows as demonstrated in an early life-stage test. Chronic studies in daphnids suggest that emamectin benzoate reduces egg production, young survival, and growth at concentrations between 0.088 and 0.16 µg ai/L. Estuarine/marine

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invertebrates (mysid shrimp) were shown to be considerably more sensitive than daphnids to chronic exposures. Emamectin benzoate exposure caused effects including reduced growth at a 28-day mean measured concentration of 0.013 µg ai/L.

Emamectin benzoate is highly toxic to mammals (LD_{50} in mice = 22 mg ai/kg-bw) and birds (LD_{50} in mallards = 46 mg ai/kg-bw) on an acute oral basis. Emamectin is a potent neurotoxicant and induced signs of neurotoxicity at all doses tested in some surrogate bird and mammalian species tested. repeated exposure to emamectin benzoate did not result in any reproductive effects in birds at up to 40 mg ai/kg-diet in mallards and at up to 125 mg ai/kg-diet in bobwhite; however, higher dietary concentrations were not tested (however, the highest EEC is considerably lower than these levels). Emamectin benzoate is a reproductive toxicant in mammals. In a 2-generation reproduction study in rats, the insecticide caused decreased fecundity and fertility indices and increased incidences of clinical signs of neurotoxicity (including tremors and hind limb extension) in offspring of both generations at daily oral gavage doses of 1.8 mg ai/kg-bw (NOAEL was 0.6 mg ai/kg-bw).

Emamectin benzoate did not cause significant inhibition in aquatic plants up to 94 µg ai/L in duckweed and at up to 3.9 µg ai/L in green algae. Phytotoxicity was not observed in the aquatic plant toxicity tests. No terrestrial studies are available, the impact to terrestrial plants exposed to emamectin benzoate is uncertain.

Emamectin benzoate is highly toxic to beneficial insects (bee LC_{50} = 3.5 ng/bee) and emamectin benzoate residues on foliar plants remain lethal 24 hours post application.

Toxicity data on amphibians and reptiles were not available; therefore, birds were used as a surrogate for reptiles and terrestrial-phase amphibians, while freshwater fish were used as a surrogate for aquatic-phase amphibians.

F. Conclusions – Potential Risks to Non-target Animals and Plants

LOCs were exceeded for non-target mammals (acute and chronic exposures), birds (acute exposures), aquatic invertebrates (acute exposures), and estuarine/marine invertebrates (chronic exposures) based on the proposed use of emamectin benzoate on tree nuts and pistachios. Potential risk to non-target insects is also presumed. Data were not submitted to allow for an assessment of risk to terrestrial plants; consequently, the risk cannot be precluded and presumed until data indicate otherwise. Risk conclusions are presented below in Table A for aquatic animals and plants and in Table B for terrestrial animals and plants.

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Table A. Emamectin Benzoate Insecticide: Summary of Environmental Risk Conclusions for Aquatic Animals & Plants		
Assessment Endpoint	**Use Patterns with LOC Exceedances**	**Summarized Risk Characterization**
Acute and Chronic Risk to Freshwater Fish and Aquatic-phase Amphibians	None	Acute: Fish 96-hour LC_{50} = 174 µg ai/L, RQ <0.01. Peak EEC is 0.17 µg/L, which is >1000 times lower than 174 µg ai/L. A fish LC_{50} would need to be ≤ 3.4 µg ai/L to yield an RQ that exceeds the listed species LOC of 0.05. Chronic: Fish Early Life Stage NOAEC = 6.5 µg ai/L, RQ <0.1. 60-day EEC is 0.045 µg/L based on most conservative aquatic exposure scenario, which is >100 times lower than 6.5 µg ai/L. A fish NOAEC would need to be ≤0.045 µg ai/L to yield an RQ that exceeds the listed species LOC of 1.0. Consequently, non-target freshwater fish and aquatic-phase amphibians adjacent to an agricultural site receiving runoff/drift would not be at risk for adverse effects on survival, growth, or reproduction as a result of the proposed uses of emamectin benzoate.
Acute Risk to Freshwater Invertebrates	3 air blast applications at 0.015 lb ai/A with 7-day reapplication intervals.	Daphnid 48-hour EC_{50} = 1.0 µg ai/L, RQ is 0.17 (above 0.05 LOC) based on Georgia pecans, the most conservative aquatic exposure scenario. Using the Peak EEC of 0.17 µg/L from the GA pecans scenario, the Restricted Use and Endangered Species LOCs are exceeded. The Endangered Species LOC is also exceeded based on the Oregon filbert scenario. Consequently, non-target freshwater invertebrates adjacent to an agricultural site receiving runoff/drift would be at risk for adverse effects on survival as a result of the proposed uses of emamectin benzoate.
Chronic Risk to Freshwater Invertebrates	None	Daphnid Life Cycle NOAEC = 0.088 µg ai/L, RQ = 0.5 (below 1.0 LOC). 21-day EEC is 0.048 µg/L, which is >20 times lower than 0.088 µg ai/L. A daphnid NOAEC would need to be ≤0.048 µg ai/L to yield an RQ that exceeds the listed species LOC of 1.0. Consequently, non-target freshwater invertebrates adjacent to an agricultural site receiving runoff/drift would not be at risk for adverse effects on growth or reproduction as a result of the proposed uses on emamectin benzoate.
Acute and Chronic Risk to Estuarine/Marine Fish	None	Acute and Chronic: Estuarine/marine Fish LC_{50} and NOAEC = 1430 and 30 µg ai/L, respectively. RQ < LOC. Peak and 60-day EECs are 0.17 and 0.045 µg/L, which is >8000 times lower than 1430 µg ai/L and >600 times lower than 30 µg ai/L, respectively. An estuarine/marine fish LC_{50} and NOAEC would need to be ≤3.4 and 0.045 µg ai/L to yield an RQ that exceeds the listed species LOC of 0.05 and 1.0, respectively. Consequently, non-target estuarine/marine fish adjacent to an agricultural site receiving runoff/drift would not be at risk for adverse effects on survival, growth, or reproduction as a result of the proposed uses on emamectin benzoate.

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Table A. Emamectin Benzoate Insecticide: Summary of Environmental Risk Conclusions for Aquatic Animals & Plants		
Assessment Endpoint	**Use Patterns with LOC Exceedances**	**Summarized Risk Characterization**
Acute Risk to Estuarine/Marine Invertebrates	3 air blast applications at 0.015 lb ai/A with 7-day reapplication intervals.	Mysid 96-hour LC_{50} = 0.04 µg ai/L, RQ is 4.3 (above 0.05 LOC) based on Georgia pecans, the most conservative aquatic exposure scenario. Using the Peak EECs of 0.17, 0.05, and 0.02 µg/L from the GA pecan, OR filbert, and CA almond scenarios, the Acute Risk, Restricted Use, and Endangered Species LOCs are all exceeded for estuarine/marine invertebrates. Consequently, non-target estuarine/marine invertebrates adjacent to an agricultural site receiving runoff/drift would be at risk for adverse effects on survival as a result of the proposed uses of emamectin benzoate.
Chronic Risk to Estuarine/Marine Invertebrates	3 air blast application at 0.015 lb ai/A with 7 day reapplication interval.	Mysid Life Cycle NOAEC = 0.0087 µg ai/L, RQ = 5.5 based on Georgia pecans, the most conservative aquatic exposure scenario. Using the 21-day EECs of 0.048, 0.025, and 0.01 µg/L from the GA pecan, OR filbert, and CA almond scenarios, the Chronic Risk and Endangered Species LOC is all exceeded for estuarine/marine invertebrates. Consequently, non-target estuarine/marine invertebrates adjacent to an agricultural site receiving runoff/drift would be at risk for adverse effects on growth and reproduction as a result of the proposed uses of emamectin benzoate.
Risk to Aquatic Vascular Plants	None	Duckweed EC_{50} >94 mg ai/L; NOAEC = 94 µg ai/L (limited dose test). Highest aquatic EEC is 0.17 µg ai/L, which is >500 times less than the EC_{50}. Consequently, non-target aquatic vascular plants adjacent to an agricultural site receiving runoff/drift would not be at risk for adverse effects of survival or growth as a result of the proposed uses of emamectin benzoate.
Risk to Aquatic Non-vascular Plants	None	Green algae EC_{50} >3.9 mg ai/L; NOAEC = 3.9 µg ai/L (limited dose test). Highest aquatic EEC is 0.17 µg ai/L, which is >20 times less than the EC_{50}. Consequently, non-target aquatic non-vascular plants adjacent to an agricultural site receiving runoff/drift would not be at risk for adverse effects of survival or growth as a result of the proposed uses of emamectin benzoate.

Table B. Emamectin Benzoate Insecticide: Summary of Environmental Risk Conclusions for Terrestrial Animals and Plants		
Assessment Endpoint	**Use Patterns with LOC Exceedances**	**Summarized Risk Characterization**
Acute Risk to Birds (including terrestrial-phase amphibians and reptiles)	3 air blast application(s) at 0.015 lb ai/A with 7 day reapplication intervals.	Bird LC_{50} and LD_{50} values are 570 and 46 mg ai/kg, respectively. Using upper-bound Kenaga EEC, the Restricted Use and Endangered Species LOCs are exceeded for 20 g birds that forage on short grass and the Endangered Species LOC is exceeded for 20 g birds that forage on tall grass, broadleaf plants, and small insects, while the Endangered Species LOC is also exceeded for 100 g birds that forage on short grass. Consequently, birds foraging in an agricultural site would be at risk for adverse effects on survival as a result of the proposed uses of emamectin benzoate. However, the LOC is not exceeded for large (1000 g) birds that

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Table B. Emamectin Benzoate Insecticide: Summary of Environmental Risk Conclusions for Terrestrial Animals and Plants		
Assessment Endpoint	**Use Patterns with LOC Exceedances**	**Summarized Risk Characterization**
		forage on any of the assessed feed items or birds of all weight classes that forage on fruits, pods, and seeds.
Chronic Risk to Birds (including terrestrial-phase amphibians and reptiles)	None	Bird NOAEC = 40 mg ai/kg-diet. Using upper-bound Kenaga EECs based on the most conservative terrestrial exposure scenario, the Chronic Risk and Endangered Species LOC is not exceeded for birds foraging food items treated with emamectin benzoate. Consequently, birds foraging in an agricultural site from emamectin benzoate treatments would not be at risk for adverse effects on growth or reproduction as a result of the proposed uses of emamectin benzoate.
Acute Risk to Mammals	1-3 air blast application(s) at 0.015 lb ai/A with 7-day reapplication intervals.	Mammal LD_{50} = 22 mg ai/kg-bw. The upper bound Kenaga EEC based on the most conservative terrestrial exposure scenario (3 air blast applications at 0.015 lb ai/A with 7-day reapplication intervals) exceeds the Restricted Use and Endangered Species LOCs for 15 g and 35 g mammals that forage on short grass. The Endangered Species LOC was exceeded for 1000 g mammals that forage on short grass, for 15 g mammals that forage on tall grass and for 15 g and 35 g mammals that forage on broadleaf plants and small insects. Consequently, these classes of mammals foraging a variety of feed items in an agricultural site would be at risk for adverse effects on survival as a result of the proposed uses of emamectin benzoate. However, the LOC is not exceeded for mammals that forage on fruits, pods, and seeds after three emamectin benzoate applications.
Chronic Risk to Mammals	1 - 3 air blast application(s) at 0.015 lb ai/A with 7 day reapplication intervals.	Mammal NOAEC = 12 mg/kg-diet based on a NOAEL of 0.6 mg/kg/day. Using upper-bound Kenaga EECs, the Chronic Risk and Endangered Species LOC is exceeded for herbivore and insectivore mammals of all sizes assessed (up to 1000 grams) that forage on a variety of food items except seeds, fruits, pods. These classes of mammals would be at risk for adverse effects on growth and reproduction as a result of the proposed uses of emamectin benzoate. Although there is an exceedance of the chronic LOC, the potential for risk of adverse effects is based on the assumption that mammals are feeding exclusively within agricultural areas where emamectin benzoate is used. The exceedance to mammals following one or three application(s) is based on the assumption that mammals occupy, exclusively and permanently, the area of proposed uses, and forage feed items with emamectin benzoate residues. To the extent that those mammals do not reside exclusively and permanently within the area, exposure will be less and risk is presumably less.
Risk to Non-target Beneficial Insects	Not applicable	EFED currently does not quantify risk to non-target terrestrial insects; however, available honeybee toxicity data indicate that Emamectin benzoate is highly toxic to honeybees from direct treatment and foliar residues remain lethal 24 hours post-

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Table B. Emamectin Benzoate Insecticide: Summary of Environmental Risk Conclusions for Terrestrial Animals and Plants		
Assessment Endpoint	**Use Patterns with LOC Exceedances**	**Summarized Risk Characterization**
		application; therefore, precautionary label language to protect bees from emamectin benzoate exposures is required. In addition, emamectin benzoate is an insecticide; there are some concerns to listed insects.
Risk to Terrestrial Plants	No data available	Until toxicity data are available, the potential risks to terrestrial monocots and dicots cannot be precluded at this time and assumed directly affected.

G. Conclusions – Threatened and Endangered Species

Direct effects LOCs were exceeded for birds, terrestrial-phase amphibians, reptiles, mammals, aquatic invertebrates and concerns for insects and terrestrial plants. Therefore, there is potential for indirect effects to all terrestrial animals and plant taxa that depend on those animals as pollinators or seed dispersers, mammal or reptile burrows for habitat, feeding, or cover requirements, and for survival, growth, or reproduction. In addition, toxicity data for terrestrial plants are not available. If those plants are found to be sensitive to emamectin benzoate, there might be direct effects to those taxa and possible indirect effects to animal and plant taxa from loss of cover or food sources. The threatened and endangered animal and plant species that reside in areas where emamectin benzoate may be used, and the basis for the designation, are in Appendices E thru K and are summarized in Table C, below.

Table C. Listed Taxonomic Groups Potentially at Risk for Direct or Indirect Effects as a Result of Emamectin Benzoate Applications *(Applications are for Food Uses where Tree Nuts Crop Group and Pistachios are grown Nationwide).*				
Listed Taxon	**Direct Effects**	**Basis for Direct Effects Concern**	**Indirect Effects**	**Basis for Indirect Effects Concern**
Terrestrial and Semi-Aquatic Plants – monocots and dicots	Yes	Toxicity data are not available for terrestrial plants exposed to emamectin benzoate. If terrestrial plants are sensitive to emamectin benzoate, there might be direct effects to terrestrial plants. Therefore, the risks to terrestrial plants from emamectin benzoate uses cannot be precluded at this time and are assumed directly affected.	Yes	Potential concerns for monocots and dicots that use birds, mammals, reptiles, and terrestrial-phase amphibians as pollinators or seed dispersers. If pollinators are directly affected by emamectin benzoate use, there might be indirect effects to terrestrial plants due to loss of pollinators for flower fertilization.
Beneficial Insects (Honeybees)	Yes	Precautionary labeling required.	Yes	Potential concerns for beneficial insects that depend on mammal or reptile burrows for habitat, feeding, or cover requirements. If wildlife burrows are directly affected, there might be indirect effects to beneficial insects due to loss of wildlife burrows for shelter.

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Table C. Listed Taxonomic Groups Potentially at Risk for Direct or Indirect Effects as a Result of Emamectin Benzoate Applications *(Applications are for Food Uses where Tree Nuts Crop Group and Pistachios are grown Nationwide).*

Listed Taxon	Direct Effects	Basis for Direct Effects Concern	Indirect Effects	Basis for Indirect Effects Concern
Birds and Reptiles[1]	Yes	The endangered species LOC is exceeded.	Yes	Potential concerns for birds and reptiles that eat terrestrial and aquatic wildlife as a food resource and/or depend on burrows or plants for habitat, feeding, or cover requirements. If wildlife and plants are directly affected, there might be indirect effects to birds and reptiles due to loss of food and shelter.
Terrestrial-phase Amphibians[1]	Yes	The endangered species LOC is exceeded.	Yes	Potential concerns for terrestrial-phase amphibians that eat terrestrial and aquatic wildlife as a food source and/or depend on reptile burrows or plants for habitat, feeding, or cover requirements. If wildlife and plants are directly affected, there might be indirect effects to terrestrial-phase amphibians due to loss of food and shelter.
Mammals	Yes	The endangered species LOC is exceeded.	Yes	Potential concerns for mammals that eat terrestrial and aquatic wildlife as a food source and/or depend on reptile burrows or plants for habitat, feeding, or cover requirements. If wildlife and plants are directly affected, there might be indirect effects to mammals due to loss of food and shelter.
Freshwater and Estuarine/marine Invertebrates	Yes	The endangered species LOC is exceeded	Yes	Potential concerns for aquatic invertebrates that eat terrestrial and aquatic wildlife as a food source and/or depend on plants for habitat, feeding, or cover requirements. If wildlife and plants are directly affected, there might be indirect effects to aquatic invertebrates due to loss of cover and food.
Freshwater Fish and Aquatic-phase Amphibians[2]	No	No LOC exceedances	Yes	Potential concerns for freshwater fish and aquatic-phase amphibians that eat terrestrial and aquatic wildlife as a food source and/or depend on plants for habitat, feeding, or cover requirements. If wildlife and plants are directly affected, there might be indirect effects to freshwater fish and aquatic-phase amphibians due to loss of cover and food.
Estuarine / marine Fish	No	No LOC exceedances	Yes	Potential concerns for estuarine/marine fish that eat terrestrial and aquatic wildlife as a food source and/or depend on plants for habitat, feeding, or cover requirements. If wildlife and plants are directly affected, there might be indirect effects to estuarine/marine fish due to loss of cover and food.
Aquatic Vascular and Nonvascular Plants	No	No LOC exceedances	Yes	Potential concerns for aquatic plants that depend on pollinators and aquatic invertebrates for habitat, pollinating, feeding,

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Table C. Listed Taxonomic Groups Potentially at Risk for Direct or Indirect Effects as a Result of Emamectin Benzoate Applications *(Applications are for Food Uses where Tree Nuts Crop Group and Pistachios are grown Nationwide).*				
Listed Taxon	**Direct Effects**	**Basis for Direct Effects Concern**	**Indirect Effects**	**Basis for Indirect Effects Concern**
				or cover requirements. If wildlife and plants are directly affected, there might be indirect effects to aquatic plants due to loss of cover, pollen, and food.

1 Birds are used as surrogate species for terrestrial-phase amphibians and reptiles; therefore, potential direct and indirect effects to endangered avian, terrestrial-phase amphibians and reptilian species are considered equivalent.

2 Fish are used as a surrogate for aquatic phase amphibians; therefore, potential direct and indirect effects to endangered fish and aquatic-phase amphibian species are considered equivalent.

H. Uncertainties and Data Gaps

A number of uncertainties were identified in previous assessments. The uncertainties and data gaps for the insecticide, emamectin benzoate, are summarized in Table D below. The uncertainties are discussed throughout this assessment, and are summarized in Description of Assumption, Limitations, Uncertainties, Strengths and Data Gaps section of this document.

Table D. Summary of Uncertainties and Data Gaps for Emamectin Benzoate		
Selected Uncertainty	**Value of Additional Testing**	**Comment**
		Aquatic Assessment
Toxicity data on sediment dwelling organisms is not available	High	Emamectin benzoate is expected to partition to the sediment and is very highly toxic to other aquatic organisms. Therefore, there may be potential risk to sediment-dwelling organisms.
pH may affect aquatic toxicity of emamectin	Moderate to high	Some physicochemical properties of emamectin benzoate are affected by pH including solubility and Kow. These parameters could affect toxicity; therefore, establishment of the influence of pH on toxicity would be beneficial to this assessment.
Analytical detection of emamectin benzoate is not sensitive relative to its toxicity to aquatic organisms	Moderate	The NOAEC in mysid shrimp was between 0.0049 and 0.011 µg ai/L (mean of 0.0087 µg ai/L). The analytical detection limit reported in that study was 0.005 µg/L. An analytical method that is able to detect emamectin at levels that are 10-fold below the NOAEC in mysid shrimp is recommended (0.00087 µg ai/L).
Acceptable life cycle study in mysid shrimp has not been submitted.	Low	Guideline 850.1350 was not fulfilled by the submitted studies (MRIDs 44305601 and 45833001) because erratic test concentrations occurred. However, the two submitted studies, taken together, allow for a reasonable estimate of a NOAEC for use in risk assessment. Therefore, additional testing will not likely have significant impact on the risk assessment.

Table D. Summary of Uncertainties and Data Gaps for Emamectin Benzoate		
Selected Uncertainty	**Value of Additional Testing**	**Comment**
		Terrestrial Assessment
Toxic degradates have been identified.	Moderate to high	A major photodegradate of emamectin benzoate on plants and soil, N-formyl-N-methyl degradate, has been shown to be approximately as toxic as emamectin benzoate to mammals. No toxicity data in birds have been submitted.
Terrestrial plant toxicity data have not been submitted	High	The proposed update to Part 158 (Data Requirements for Conventional Pesticides) has expanded the vegetative vigor and seedling emergence data requirements to include terrestrial food and outdoor residential uses, and the proposed uses of emamectin benzoate include terrestrial food uses. There is a potential for emamectin benzoate exposure via drift and/or runoff to non-target terrestrial plants located in areas adjacent to or near the emamectin benzoate application areas. However, there are no terrestrial plant toxicity data available to quantify the potential effects of emamectin benzoate on seedling emergence or vegetative vigor of non-target plants. The value of toxicity studies for terrestrial plants (Guidelines 850.4100 and 850.4150) would be in determining risks to plants including defining an action area for endangered species. Risk mitigation strategies (*e.g.*, determining maximum emamectin benzoate application rate that results in an RQ below the LOC) cannot be evaluated without these data.
Emamectin benzoate is a potent neurotoxin.	Not applicable	Sublethal and neurotoxic effects have been identified in birds and mammals that could affect survival in the wild. Therefore, risk quotients may underestimate potential risk to birds and mammals. It is uncertain if risk to mammals was under- or over-estimated. Acute risk to mammals may have been underestimated because this assessment was based on lethality. However, emamectin benzoate caused neurotoxic effects including tremors and ataxia at sub-lethal doses. These toxic responses could affect an animals' ability to survive in the wild. However, such a relationship with these effects and the ability of an animal to reproduce, survive, or grow could not be quantified. Also, emamectin benzoate was assumed to degrade from mammalian food items at a half-life of 6.2 days. However, a major photodegradate of emamectin benzoate on plants and soil, the N-formyl-N-methyl degradate, was shown to be approximately as toxic to the nervous system of mammals as emamectin benzoate. The principle degradation pathway for emamectin benzoate is expected to be photodegradation. Therefore, risk to mammals could persist in the field even after emamectin benzoate degrades.

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II. ANALYSIS

A. Use Characterization

Application rates for this new use ae the same of the use rates previously assessed for pome fruits. The proposed single application rates on pistachios and tree nuts are from 0.010 to 0.015 lb ai/A, but not to exceed 0.045 lbs ai/A (3 applications at the maximum application rate), per growing season, with a minimum application interval of 7 days, and a pre-harvest interval of 14 days. The label recommends choosing the application rate based on the degree of insect infestation from low to moderate to severe.

Emamectin benzoate, Proclaim® Insecticide, is currently registered for use on fruiting vegetables, brassica head and stem vegetables, leafy vegetables and pome fruit. Current end use products include an emulsifiable concentrate (Proclaim 0.16 EC). It is applied via ground, air, or as a spray blast.

The label has an advisory language for spraying adjacent to permanent water bodies no nearer than 25 feet for ground applications, and 150 ft for aerial applications, possibly as buffer zones. These restrictions were not modeled in this assessment because spraying on pome fruits (D309154) indicate complete elimination of spray drift did not result in reduction of LOCs below levels of concern for saltwater invertebrates (mysid shrimp).

USDA maps (Figures 1, 2, and 3 below) indicating the acreage for the three major types of tree nut grown in this country are representative of the national distribution of the expected major use sites for this new use of emamectin benzoate.

The proposed use pattern for tree nuts and pistachios is similar to current emamectin benzoate uses. Emamectin benzoate is currently registered for use on fruiting vegetables, brassica head and stem vegetables, leafy vegetables, and pome fruits (see Table 1 for application rates). The application rates for these uses range from 2.4 oz ai/A (low infestations) to 4.8 oz ai/A (high infestations) (0.0075 to 0.015 lb ai/A, respectively) per application with a maximum seasonal load of 28.8 oz ai/A (0.09 lbs ai/A). The minimum application interval is 7 days. The proposed new use pattern and the currently registered use patterns are summarized in Table 1 below.

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Table 1. Summary Use Characterization for Emamectin benzoate[1]

Use	Max. Single Application Rate (lbs a.i./acre)	Minimum Application Interval (Days)	Total Annual Load (lbs a.i./Acre)	Maximum Number of Annual Applications
Approved Uses				
Brassica leafy vegetables[2]	0.0075 - 0.015	7	0.09	6 - 12
Fruiting vegetables[3]	0.0075 - 0.015	7	0.09	6 - 12
Leafy vegetables[4]	0.0075 - 0.015	7	0.09	6 - 12
Pome fruits[5]	0.010 - 0.015	7	0.045	3 - 4
Proposed New Use				
Tree Nuts[6]	0.010 - 0.015	7	0.045	3

1 Data obtained from the draft label (No. SCP 904A-L) dated 04/02/2003.

2 Broccoli, broccoli raab, brussels sprouts, cabbage, cauliflower, cavalo broccolo, Chinese broccoli, Chinese cabbage, Chinese mustard cabbage, collards, kale, kohlrabi, mizuna, mustard greens, mustard spinach, rape greens, and turnip tops (leaves, roots cannot be used for human food or animal feed)

3 Tomato, peppers (bell, chili, cooking, pimento, and sweet), eggplant, ground cherry, pepino, tomatillo

4 Amaranth, arugula, cardoon, celery, celtuce, chervil, Chinese celery, edible-leaved chrysanthemum, garland chrysanthemum, corn salad, garden/upland cress, dandelion, dock, endive, fennel, florence, head lettuce, leaf lettuce, orach, parsley, garden/winter purslane, radicchio, rhubarb, spinach, new zealand spinach, vine spinach, Swiss chard

5 Apple, crabapple, loquat, mayhaw, oriental pear, pear, and quince

6 **Almond, beech nut, brazil nut, butternut, cashew, chestnut, chinquapin, filbert, hickory nut, macadamia nut, pecan, pistachio, and walnut**

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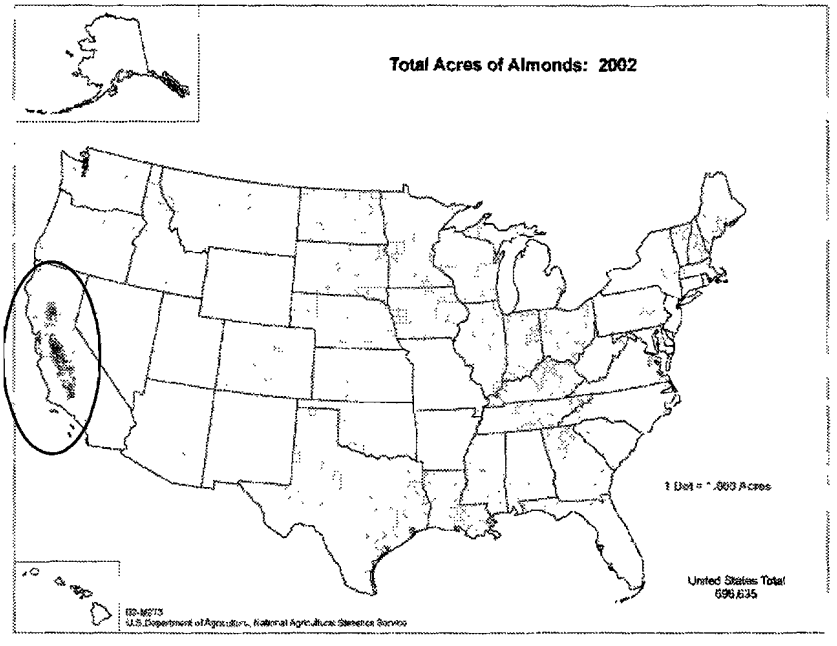

Figure 1. Areas in the United States Where Almonds are Grown

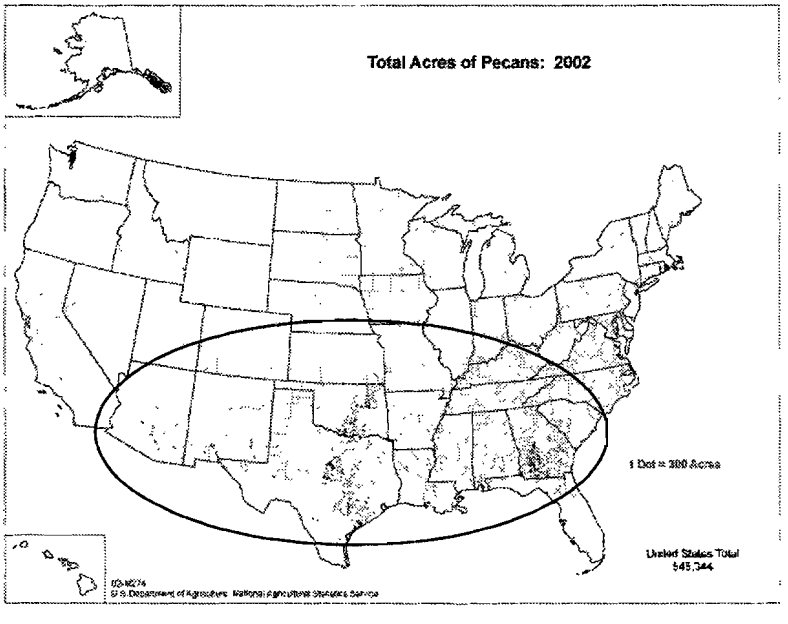

Figure 2. Areas in the United States Where Pecans are Grown

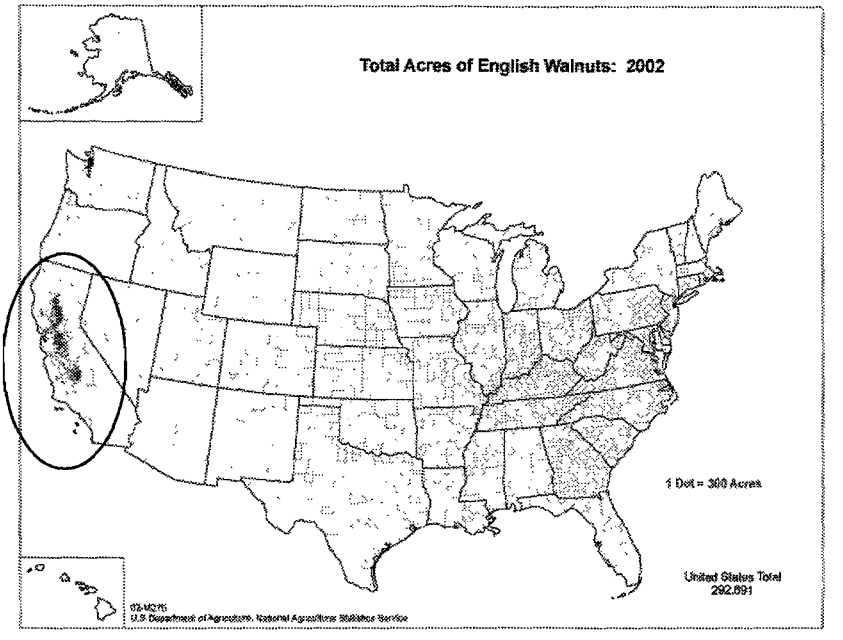

Figure 3. Areas in the United States Where English Walnuts are Grown

B. Exposure Characterization

1. Environmental Fate and Transport Characterization

The environmental fate database has been discussed in depth in previous assessments (New Chemical Review, 2000; D226628 and New Use Reviews, 2002 and 2005; D279810, D279841 and D309154) and is considered essentially complete. A brief summary of emamectin benzoate's environmental fate profile and a summary of transformation/dissipation half-lives and bioconcentration factor (BCF) values are provided below. Previous reviews may be referenced for additional information.

Terrestrial Environments: Mobility studies conducted with emamectin benzoate indicate that the parent compound and its degradates would be expected to be relatively immobile in the environment due to a high degree of sorption to soil particles (K_d 219 to 2037; Koc 25,000 to 730,000 ml/g). Therefore, most of the emamectin benzoate applied to a field is expected to remain at the site of application until it degrades or is transported off the field via soil erosion. For this reason, high levels of parents and/or transformation products are not expected to enter surface water through runoff or to leach into ground water. The low emamectin benzoate vapor pressure suggests that volatilization from soil is expected to be minimal. Emamectin benzoate is resistant to microbial degradation with an aerobic soil metabolism half-life = 193 days and is stable to hydrolysis, and is expected to be persistent when it is attenuated from light. This can happen by incorporation into soil or by being shaded by the crop canopy. The primary environmental dissipation pathway of emamectin benzoate is expected to be through photolysis

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on soil (half-life 5 days). While emamectin benzoate is not expected to persist in the field when exposed to sunlight, EFED standard PRZM/EXAMs scenarios for apples assume a maximum 90% crop canopy cover for apple orchards. The environmental fate of emamectin benzoate used on mature apple and pear orchards which leaf-out to the maximum canopy coverage in spring, may differ from previously registered crops where the canopy would slowly close as the crop matures. Submitted terrestrial field dissipation studies conducted on bare, unshaded soil report DT_{50} values ranging from 4 to 24 hours and DT_{90} values ranging from 7 to 100 days. No field dissipation studies using cropped ground have been submitted.

Aquatic Environments: Emamectin benzoate is expected to enter the water primarily through soil erosion. Once in an aquatic system, emamectin benzoate is likely to remain bound to sediment or suspended particles. It does not hydrolyze in water at pH 5 to 8, but slowly hydrolyzes at pH 9 (half-life 20 weeks). Its low Henry's Law constant suggests that volatilization from water is likely to be negligible. Although emamectin benzoate degrades rapidly through aqueous photolysis, other than in oligotrophic systems (clear, shallow water bodies; low in organic matter content), aqueous photolysis is not likely to significantly contribute to the degradation of emamectin benzoate. It is also not expected to bioconcentrate to any appreciable extent (highest BCF = 98).

a. Degradates of Concern

Four degradates of concern have been identified by the Agency (Table 2 below). Exposure to both emamectin benzoate and the identified degradates of concern are considered in this assessment. Based on the structures of these degradates (Appendix A), their environmental fate and transport properties are expected to be similar to parent emamectin benzoate. All of the degradates of concern are photolysis transformation products that were detected in soil photolysis studies. The degradate known as ZMA also formed through aqueous photolysis.

Table 2. Emamectin Benzoate Degradates of Concern

Degradate Name	Maximum of Applied Dose	Day of Maximum / Study Duration	Guideline / MRID	Study Type
8,9-Z MA ((8,9-Z)-4"-epimethylamino-4"-deoxy avermectin B1)	3.7 %	30 / 30 days	161-3 / 43404302	Soil Photolysis
	17 %	1 / 30 days	161-2 / 43850114	Aqueous Photolysis
AB1a (4"-epiamino-4"-deoxyavermectin B1)	<5 %	unknown / 30 days	161-3 / 43404302	Soil Photolysis
MAB1a (avermectin B1 monosaccharide)	<5 %	unknown / 30 days	161-3 / 43404302	Soil Photolysis
FAB (4"-epi-(N-formyl)-4"-deoxyavermectin B1)	<5 %	unknown / 30 days	161-3 / 43404302	Soil Photolysis

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b. Relevant Emamectin Benzoate Total Toxic Residue Environmental Fate Data Used in this Assessment.

Relevant half-lives used in describing the environmental fate of the emamectin benzoate toxic residue are in Table 3 below. Total toxic residue half-lives are calculated by the addition of reported concentrations of each residue at each sampling interval. The natural log of the sums from each sampling interval is regressed against time to determine the total toxic residues half-lives ($t_{1/2}$ = ln2/-k). Mobility input parameters are the lowest, and therefore most conservative, K_{oc} / K_d value from the combined dataset. Fate inputs used in EEC calculations are based on these data and are presented in Table 4.

Table 3. Summary of Environmental Fate Properties of Emamectin Benzoate Total Toxic Residues Used in Assessment

Study Type	Value	Test System	Source / MRID Number
Hydrolysis	half-life = stable	pH 5 and 7	42743642
Aquatic Photodegradation	half-life = 23 days	natural sunlight	43850114
Photodegradation on Soil (adjusted for dark control)	13 days		43404302
Aerobic Soil Metabolism	half-life = 193 days	sandy loam soil	43404303
Anaerobic Soil Metabolism (total system)	half-life = 174 days		43850116
Anaerobic Aquatic Metabolism (total system)	half-life = 427 days		43850116
Adsorption/Desorption (K_{oc})	279,000 - 730,000 - 25,382 - 28,365 parent immobile	batch equilibrium	42851526
	minor deg. some mobility	aged column	43850117
Terrestrial Field Dissipation (total system; non-linear)	half-life = 4 – 7 hours; half-life = 4 – 9 hours; half-life = 6 – 10 hours	San Joaquin Valley, CA Somerton, AZ Waterloo, NY	43850118
Bioconcentration in Fish	31 X	edible tissue	43393005
	98 X	visceral tissue	
	69 X	whole fish	

c. Foliar Dissipation

A comprehensive description of the submitted foliar dissipation studies is included in previous assessments (New Chemical Review, D226628). In summary, foliar dissipation half-life values were determined from a cabbage metabolism study (MRID 43850121). Foliar dissipation half-lives ranged from approximately 5.2 to 6.2 days. Therefore, a half-life of 6.2 days was used to assess exposures to terrestrial animals that consume contaminated food items.

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2. Measures of Aquatic Exposure

Computer models that simulate the fate of pesticide in the environment are used to calculate Estimated Environmental Concentrations (EECs) in surface water. This information is used to evaluate pesticide exposure to aquatic species such as fish, invertebrates and plants. The EECs are based on laboratory fate data that describe how fast the pesticide will degrade, and how it will move in the environment.

To determine ecological risks associated with agricultural uses of emamectin benzoate, EECs of the pesticide and the degradates of toxicological concern in surface water were modeled using the Tier II model PRZM (Pesticide Root Zone Model, version 3.12.2 complied May 2005), and EXAMS (Exposure Analysis Modeling System, version 2.98.04.06 complied April 2005). PRZM simulates runoff and erosion from an agricultural field resulting from a single rainfall event on daily time steps. The runoff and erosion flux output data from PRZM are used as chemical loadings to the EXAMS surface water program in order to predict the aquatic EECs. A graphical user interface (pe5.pl), developed by the EPA http://www.epa.gov/oppefed1/models/water, was used to facilitate the input of chemical and use specific parameters into the appropriate PRZM input files and EXAMS chemical file.

Surface water EECs were modeled for the total toxic residues (parent and degradates of concern) of emamectin benzoate using an ecological pond (EXAMS Mississippi pond) and the following PRZM scenarios: Georgia Pecan, California Almond, and Oregon Filbert. These scenarios are used as surrogates for all of the proposed new emamectin benzoate uses because they represent the major growing areas for tree nuts and pistachios. Input parameters for the PRZM/EXAMS modeling are listed in Table 4, and the resulting EECs are presented in Table 6 (air blast application). EECs were calculated using the standard spray drift assumptions of 1% for air blast spray which is expected to be the common application type for these uses.

Total toxic residues inputs were generated by calculating half-life values using the combined residues of the parent compound and any degradation products assumed to have equal toxicity with the parent. Because the total percent of the residues of toxicological concern for the degradation products were small compared to the parent compound, data on the parent were used when data for the degradation product is either missing, or difficult to calculate a combined value for the parent/degradate mixture, such as the molecular weight, or K_{oc} values.

Table 4. Model Input Parameters for Total Toxic Residues[1]

Parameters	Values & Units	Sources
Molecular Weight	964 amu	Science Chapter (New Chemical Review, D226628)
Henry's Law Constant (25°C)	3.8×10^{-10} atm m^3/mol	Product Chemistry; MRID 44883705
Aqueous Solubility (pH 7.0 and 25°C)	93 mg/L	Product Chemistry; MRID 44883704

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Hydrolysis Half-Life (pH 7)	stable	MRID 42743642
Aerobic Soil Metabolism Half-life	579 days	MRID 43404303; 193 day half-life times 3 for single value.
Anaerobic Aquatic Metabolism (total sediment / water system)	1281 days	MRID 43850116; 427 day half-life times 3 for single value
Aerobic Aquatic Metabolism (total sediment/water system)	1158 days	Aerobic half-life value; 193 days times 3 times 2 for single value
Aqueous Photolysis	23 days	MRID 43850114; maximum value
Soil Water Partition Coefficient	265,687	average K_{oc} (279,000-730,000-25,382 - 28,365); MRID 42851526
Pesticide is Wetted-In	no	Product Label
Crop Management		
Application Rate	0.015 lb a.i./acre 3 applications/ 7 day intervals	Product Label 03/26/03
First Application Date	May 25	Product Label 03/26/03
Application Method	Air-blast	Product Label 03/26/03
Spray Efficiency	0.99 (Air-blast)	EFED Default Value
Spray Drift	0.02 (Air-blast)	EFED Default Value

[1] Combined total residues include emamectin benzoate and the degradates of concern presented in Table 4.

The soil characteristics, crop emergence, and meteorological data file names, along with the first application date values used in this modeling, appear in Table 5.

Table 5. Soil Characteristics and Meteorological Parameters for Modeling

State and Agricultural Commodity	Soil Characteristics and Meteorological Data	Crop Emergence / First Application
CA - almond	MLRA: San Joaquin county (MLRA17) Metfile: W23232.dvf	CE: Jan 16 FA : Feb. 8
GA – pecan	MLRA: Mitchell and Dougherty Counties (MLRA133A) Metfile: W93805.dvf	CE: April 16 FA : May 16
OR - filberts	MLRA: Washington County (MLRA 2) Metfile: W24232.dvf	CE: March 1 FA : April 1

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Table 6. Total Toxic Residue Surface Water EECs for the Proposed Emamectin Benzoate Uses on Tree Nuts Calculated by PRZM/EXAMS; Air Blast Application @ 0.015 lbs ai/acre per Application.						
Scenario	**Peak (µg/L)**	**96 Hour (µg/L)**	**21 Day (µg/L)**	**60 Day (µg/L)**	**90 Day (µg/L)**	**Yearly (µg/L)**
CA Almond	0.023	0.011	0.010	0.010	0.010	0.009
GA Pecan	0.168	0.068	0.048	0.045	0.044	0.042
OR Filbert	0.050	0.030	0.025	0.024	0.024	0.024

b. Aquatic Exposure Monitoring and Field Data

There were no monitoring data available for use in risk assessment.

3. Measures of Terrestrial Exposure

For emamectin benzoate spray applications, estimation of pesticide concentrations in wildlife food times focuses on quantifying possible dietary ingestion of residues on vegetative matter and insects. No field residue data or field study information is available for emamectin benzoate; therefore, the residue estimates were based on a nomogram that relates food item residues to pesticide application rate. The residue EECs were generated from a spreadsheet-based model (T-REX version 1.3.1) that calculates the decay of a chemical applied to foliar surfaces for single or multiple applications, and is based on the methods of Hoerger and Kenaga (1972) as modified by Fletcher *et al.* (1994). Uncertainties in the terrestrial EECs are primarily associated with a lack of data interception. To provide an upper bound on potential exposure, residue EECs were calculated for three spray applications at the maximum application rate of 0.015 lbs ai/A (maximum single application rate). EECs were calculated using a foliar dissipation half-life of 6.2 days.

The EECs on terrestrial food items may be compared directly with a dietary toxicity data or converted to an oral dose. The residue concentration in converted to daily oral dose based on the fraction of body weight consumed daily as estimated through allometric relationships. The risk assessment for emamectin benzoate uses upper bound predicted residues as the measure of exposure.

Input values used for estimating avian and mammalian exposure to emamectin benzoate are summarized in Table 7, and the resulting EECs are in Tables 8 to 10.

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Table 7. Input Parameters Used in TREX 1.3.1 to Determine Terrestrial EECs for Emamectin Benzoate		
Input Variable	**Parameter Value**	**Source**
Maximum application rate lbs a.i./Acre	0.015	Product Label
Maximum number of applications per year	Three	Product Label
Application Interval	7 days	Product Label
Foliar dissipation half-life	6.2 days	MRID 43850121

Table 8. Estimated Dietary Concentration of Emamectin Benzoate on Selected Avian and Mammalian Food Items	
Food Item	**Upper Bound EEC (mg/kg)**
	0.015 lbs a.i./Acre (3 applications)[a]
Short Grass	6.0
Tall Grass	2.8
Broadleaf plants/small Insects	3.4
Fruits/pods/seeds/large insects	0.37

[a] Applications were modeled using 7-day intervals and a foliar dissipation half-life value of 6.2 days.

Table 9. Upper Bound Daily Oral Dose Emamectin Benzoate EECs (mg/kg-bw) on Selected Food Items for Small, Medium, and Large Birds Following Three Emamectin Benzoate Treatments of 0.015 lb ai/A Based on a Foliar Dissipation Half-Life of 6.2 Days				
Food Item	**Application Rate lbs ai/Acre (No. App./Interval in days)**	**Avian Classes and Body Weights**		
		small	**mid**	**large**
		20 g	**100 g**	**1000 g**
		Upper Bound Values (mg/kg-bw)		
Short Grass	0.015 (3/7)	6.8	3.9	1.7
Tall Grass	0.015 (3/7)	3.1	1.8	0.80
Broadleaf plants/sm Insects	0.015 (3/7)	3.8	2.2	0.98
Fruits/pods/lg insects	0.015 (3/7)	0.43	0.24	0.11

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Table 9. Upper Bound Daily Oral Dose Emamectin Benzoate EECs (mg/kg-bw) on Selected Food Items for Small, Medium, and Large Birds Following Three Emamectin Benzoate Treatments of 0.015 lb ai/A Based on a Foliar Dissipation Half-Life of 6.2 Days

[a] Daily oral dose calculation assumes that 20-gram, 100-gram, and 1000-gram birds consume 114%, 65%, and 29% of their body weight, respectively.

Table 10. Upper Bound Daily Oral Dose Emamectin Benzoate EEC (mg/kg-bw) on Selected Food Items for Small, Medium, and Large Mammals Following Three Emamectin Benzoate Treatments of 0.015 lb ai/A Based on a Foliar Dissipation Half-Life of 6.2 Days

Food Item	Application Rate lbs ai/Acre (No./Interval)	Mammal Classes and Body Weights		
		small	mid	large
		15 g	35 g	1000 g
		Upper Bound Values (mg/kg-bw)		
Short Grass	0.015 (3/7)	5.7	4.0	0.92
Tall Grass	0.015 (3/7)	2.6	1.8	0.42
Broadleaf plants/sm Insects	0.015 (3/7)	3.2	2.2	0.52
Fruits/pods/lg insects	0.015 (3/7)	0.36	0.25	0.06
Seeds (Granivores)	0.015 (3/7)	0.08	0.05	0.01

[a] Daily oral dose calculation assumes that 15-gram, 35-gram, and 1000-gram mammals consume 95%, 66%, and 15% of their body weight, respectively.

b. Terrestrial Exposure Monitoring (Field Data)

Monitoring data were not available for use in risk assessment.

C. Ecological Effects Characterization

In baseline ecological risk assessments, effects characterization describes the types of effects a pesticide has on aquatic or terrestrial animals. This characterization is based on registrant-submitted studies that describe information regarding acute and chronic effects toxicity for various aquatic and terrestrial animals and plants. Surrogate test species of birds, mammals, fish, aquatic and terrestrial invertebrates and plants are used to estimate treatment-related direct effects on acute mortality and chronic reproduction, growth, and survival of non-target species. Toxicity tests include short-term acute, subacute, and reproduction/chronic studies that progress from basic laboratory tests to applied field studies. In addition, avian species are used as surrogates for terrestrial-phase amphibians and reptiles, while fish species are used as surrogates for aquatic-phase amphibians.

A summary of the toxicity data selected for this assessment is provided in this section. No new studies have been submitted for this review. Details of the registrant-submitted studies can be found in previous assessments (New Chemical Review, D226628; New Use Reviews, D309154, D279840 and D279841).

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1. Toxicity to Aquatic Animals and Plants

Table 11 presents the toxicity endpoint values used to calculate RQs and estimate risk to aquatic receptors from exposure to emamectin benzoate through surface runoff and off-site spray drift.

In summary, available acute toxicity data for aquatic species indicates that on an acute basis emamectin benzoate is highly toxic to freshwater fish, moderately toxic to estuarine/marine fish, and very highly toxic to aquatic invertebrates. Results of chronic studies with emamectin benzoate indicate that reduced larval survival and growth in fathead minnows were observed at 12 µg ai/L, reduced egg production and young survival and growth in daphnids were observed at 0.16 µg ai/L, and reduced growth in mysids was observed at 0.013 µg ai/L. A chronic value of emamectin benzoate toxicity to estuarine/marine fish was estimated using an acute to chronic ratio (ACR) approach from testing with freshwater fish. Emamectin benzoate did not cause any adverse effects to aquatic vascular plants, with an EC_{50} of >94 µg ai/L for duckweed (NOAEC = 94 µg ai/L), based on frond biomass. Results of a tier I toxicity study with freshwater green algae, a non-vascular aquatic plant, indicate that emamectin benzoate did not affect cell density with an EC_{50} of >3.9 µg ai/L (NOAEC = 3.9 µg ai/L).

In previous assessments, several uncertainties in the aquatic component of the assessment were identified in the emamectin benzoate risk assessment.

- Estimated chronic effects for estuarine/marine fish is uncertain because no chronic data were submitted by the registrant; in estimating chronic risk to estuarine/marine fish, an assumption was made that marine/estuarine fish would be of similar sensitivity as the freshwater fish.
- Lack of acceptable chronic studies with estuarine/marine invertebrates because of high variability concentrations observed during the study; the actual concentrations are uncertain and might be lower than reported.
- Emamectin benzoate is likely to bind to sediment, it is uncertain if emamectin benzoate is toxic to sediment-dwelling animals.
- Solubility and hydrophobicity are influenced by change in pH, it is uncertain if the pH will also influence the toxicity of emamectin benzoate to aquatic animals.

Up to date, no new ecotoxicity studies have been submitted; therefore, those uncertainties have not been addressed.

Table 11. Emamectin Benzoate Toxicity Endpoint Values for Assessing Risk to Aquatic Animals and Plants[1]

Exposure Scenario	Species	Exposure Duration	Toxicity Endpoint Value	Endpoint	Reference (classification)
Freshwater Fish					
Acute	Rainbow trout *Oncorhynchus mykiss*	96 hour	LC_{50} = 174 µg ai/L NOAEC = 30 µg/L	Lethality	MRID 42851529 (Acceptable)

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Chronic	Fathead Minnow *Pimephales promelas*	Early Life Stage	NOAEC = 6.5 µg ai/L LOAEC = 12 µg ai/L	Reproduction; Growth	MRID 43850107 (Acceptable)
Freshwater Invertebrates					
Acute	Water flea *Daphnia magna*	48 hour	EC_{50} = 1 µg ai/L NOAEC = 0.3 µg ai/L	Immobilization	MRID 42743603 (Acceptable)
Chronic	Water flea *Daphnia magna*	Life Cycle	NOAEC = 0.088 µg ai/L LOAEC = 0.16 µg ai/L	Growth; Reproduction	MRID 43393004 (Acceptable)
Estuarine/Marine Fish					
Acute	Sheepshead minnow *Cyprinodon variegatus*	96 hour	LC_{50} = 1430 µg ai/L NOAEC = 860 µg ai/L	Lethality	MRID 43393003 (Acceptable)
Chronic	None	None	NOAEC = 30 µg ai/L	No specific endpoint	Acute to Chronic Ratio[2]
Estuarine/Marine Invertebrates					
Acute	Estuarine/marine mysid *Americamysis bahia*	96 hour	LC_{50} = 0.04 µg ai/L NOAEC = 0.018 µg ai/L	Lethality	MRID 43393001 (Acceptable)
Chronic	Estuarine/marine mysid *Americamysis bahia*	Life Cycle	NOAEC = 0.0087 µg ai/L LOAEC = 0.013 µg ai/L	Reproduction; Growth	MRID 45833001 (Supplemental)[3]
Aquatic Plants					
Nonvascular	Green algae *Selenastrum capricornutum*	5-day	EC_{50} = >3.9 µg ai/L NOAEC = 3.9 µg ai/L	Cell density	MRID 43850108 (Acceptable)
Macrophysics	Duckweed *Lemna gibba*	14-day	EC_{50} = >94 µg ai/L NOAEC = 94 µg ai/L	Frond biomass	MRID 43850109 (Acceptable)

[1] The most sensitive or lowest endpoint of each group are selected for analysis in the risk assessment.
[2] No chronic toxicity data available for estuarine/marine fish; therefore, chronic toxicity value estimated via acute to chronic ratio.
[3] Highly erratic test concentrations were observed throughout the study. Measurements were made of dissolved and sorbed material; thus, true dissolved concentrations and toxicity parameters may be lower than reported.

2. Toxicity to Terrestrial Animals and Plants

Table 12 presents the toxicity endpoint values used to calculate RQs and estimated risk to terrestrial receptors from oral exposure to emamectin benzoate residues as the result of direct deposition and spray applications. Ground deposition, spray drift, and wind erosion of soil particles with resulting residues on foliage and on flowers and seeds are the most likely sources of emamectin benzoate exposure to non-target terrestrial animals, including endangered and threatened species. In addition, uptake in plant shoots (monocots) and roots (dicots) would be expected to occur. An additional source of exposure to emamectin benzoate could be in puddle water on treated fields through preening and grooming, involving the oral ingestion of material from the feather or fur.

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In summary, available acute toxicity data indicate that emamectin benzoate is highly toxic to waterfowl and moderately toxic to upland game birds via the oral route. Emamectin benzoate is moderately toxic to waterfowl and slightly toxic to upland game birds via the subacute dietary route. For highly toxic chemicals (LD_{50} <50 mg ai/kg-bw) such as emamectin benzoate, the acute oral toxicity values are considered a more appropriate measure of toxicity (Urban, 2000). Results of chronic studies with emamectin benzoate did not elicit any adverse effects to upland game birds and waterfowl at the concentration tested. Acute toxicity data indicate that emamectin benzoate is highly toxic to mammals. Treatment-related toxicity observed in the 2-generation reproduction study with mice exposed to emamectin benzoate was reduced fecundity, fertility indices, and clinical signs of toxicity in offspring of both generations, resulting in the NOAEC of 0.6 mg ai/kg/day. However, in the developmental neurotoxicity study with rats, a lower NOAEC of 0.1 mg ai/kg/day based on reduced motor activity was noted. It was not possible to quantify the relationship between reduced motor activity and the ability of the animal to reproduce, survive, grow; consequently, the 2-generation NOAEC of 0.6 mg ai/kg/day based on reduced fecundity (a reproduction endpoint) is used to quantify the animal's ability to reproduce, survive, or grow. Acute contact studies indicate that emamectin benzoate is highly toxic to honey bees (LD_{50} = 3.5 ng/bee). In addition, emamectin benzoate foliar residues remain lethal to honey bees 24 hours post-application. No toxicity data for terrestrial plants are available, the toxicity of emamectin benzoate to terrestrial plants are uncertain.

In previous assessments, several uncertainties in the terrestrial component of the assessment were identified in the emamectin benzoate risk assessment:

- The registered uses of emamectin benzoate include food uses. The updated Code of Federal Regulation (CFR) 40 Part 158 requires toxicity testing with terrestrial plants when a chemical is registered for use in agricultural commodities to evaluate the effects of a chemical to non-target commodities residing in areas adjacent the use sites. Without available seedling emergence and vegetative vigor studies, it is uncertain how emamectin benzoate will impact non-target and endangered plants receiving surface water runoff or off-site spray drift.
- Emamectin benzoate induced neurotoxicity in mammals at concentrations lower than these reproduction or growth endpoints used to calculate risk quotients. It is possible those neurotoxicity endpoints could cause increased susceptibility to predation or prevent an animal's ability to find food or shelter, it was not possible to quantify the relationship with neurotoxicity effects and the ability of the animal to reproduce, survive, or grow.

With the exception of neurotoxicity, no new ecotoxicity studies have been submitted and those uncertainties have not been addressed.

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Table 12. Emamectin Benzoate Toxicity Endpoint Values for Assessing Risk to Terrestrial Animals and Plants[1]					
Exposure Scenario	**Species**	**Exposure Duration**	**Toxicity Endpoint Value**	**Endpoint**	**Reference (Classification)**
Mammal					
Acute Oral	Laboratory mouse	Single Oral Dose	LD_{50} = 22 mg ai/kg-bw	Lethality	MRID 42743612 (Acceptable)
Chronic	Laboratory mouse	Two-generation	NOAEC = 0.1 mg/kg/day LOAEC = 0.6 mg/kg/day	Reduced fecundity	MRID 42851511 (Acceptable)
Birds					
Acute Oral	Mallard duck *Anas Platyrhynchos*	14 days	LD_{50} = 46 mg ai/kg-bw NOAEC < 12 mg ai/kg-bw[2]	Lethality	MRID 42743601 (Acceptable)
Subacute Dietary	Mallard duck *Anas Platyrhynchos*	8 days	LC_{50} = 570 mg ai/kg-diet NOAEC = 20 mg/kg-diet	Lethality	MRID 42851528 (Acceptable)
Chronic	Mallard duck *Anas Platyrhynchos*	Two-generation	NOAEC = 40 mg ai/kg-diet LOAEC >40 mg ai/kg-diet	No effects at doses tested	MRID 44007910 (Supplemental)[3]
Insects					
Acute Contact	Honey Bee *Apis mellifera*	96 hour	LD_{50} = 3.5 ng/bee NOAEC = 0.8 ng/bee	Lethality	MRID 42851530 (Acceptable)
Foliage	Honey Bee *Apis mellifera*	24 hour	Applied at 0.015 lbs ai/A; at 3-hr 99.6% died; at 8-hr 46.1% died; and at 24-hr 2.5% died	Lethality	MRID 43393006 (Acceptable)
Terrestrial Plants					
Seedling Emergence	Monocot – No data	No data	No data	No data	No data
Seedling Emergence	Dicot - No data	No data	No data	No data	No data
Vegetative Vigor	Monocot - No data	No data	No data	No data	No data
Vegetative Vigor	Dicot - No data	No data	No data	No data	No data

[1] The most sensitive or lowest endpoint of each group are selected for analysis in the risk assessment.
[2] Reduced body weight and signs of toxicity are observed at all dosages.
[3] These studies are considered as supplemental since LOAEC values were not determined.

3. Sub-lethal Effects

Sub-lethal effects were observed to cause lower limb weakness, reduced reaction to external stimuli, loss of coordination, depression, lethargy, wing droop, and loss of righting reflex in birds and tremors and ataxia in mammals. These sub-lethal effects occurred at concentrations much lower than those reproduction growth endpoints observed in the reproduction studies. EFED does not have the capability to quantify the relationship between these sub-lethal effects and the ability of an animal to survive, grow, or reproduce; therefore, it is uncertain how the effects will impact an animal's survivorship when such an animal is exposed to emamectin benzoate.

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III. RISK CHARACTERIZATION

A. Risk Estimation – Integration of Exposure and Effects Data

Risk characterization provides the final step in the risk assessment process. In this step, exposure and effects characterization are integrated to provide and estimate of risk relative to Agency's established levels of concern (LOCs). The results are then interpreted for the risk manager through a risk description and synthesized into an overall conclusion.

A deterministic approach is used to evaluate the likelihood of adverse ecological effects to non-target species. In this approach, risk quotients (RQs) are calculated by dividing exposure estimates (EECs) by ecotoxicity values for non-target species, both acute and chronic.

RQ = EXPOSURE/TOXICITY

RQs are then compared to Agency's levels of concern (LOCs). These LOCs are criteria used by Agency to indicate potential risk to non-target wildlife and the need to consider regulatory action. The criteria indicate that a pesticide used as directed has the potential to cause adverse effects on non-target wildlife. LOCs currently address the following risk presumption categories: (1) **acute risk** – potential for acute risk to non-target animals which may warrant regulatory action in addition to restricted use classification, (2) **acute restricted use** – potential for acute risk to non-target animals, but may be mitigated through restricted use classification, (3) **acute endangered species** – endangered species may be potentially affected by use, (4) **chronic risk** – potential for chronic risk may warrant regulatory action, endangered species may potentially be affected through chronic exposures, (5) **non-endangered plant risk** – potential for effects in non-target (non-endangered) plants, and (6) **endangered plant risk** – potential for effects in endangered plants. Currently, EFED does not perform assessments for chronic risk to plants or acute or chronic risk to non-target insects.

For acute studies on taxa where no effects were observed at any concentration level, the RQ was not calculated. For acute studies on taxa where an LC/LD50 was not established due to insufficient mortality but reported some mortality in the study, an RQ was not calculated and the study is discussed further in the Risk Description section.

The ecotoxicity test values (i.e., measurement endpoints) used in the acute and chronic risk quotients are derived from the results of required studies. Examples of ecotoxicity values derived from the results of short-term laboratory studies that assess acute effects are: (1) LC50 (fish) (2) LD50 (birds and mammals) (3) EC50 (aquatic plants and aquatic invertebrates) and (4) EC25 (terrestrial plants). An example of a toxicity test effect level derived from the results of long-term laboratory study that assesses chronic effects is: NOAEC (birds, fish and aquatic invertebrates).

Risk presumptions, along with the corresponding RQS and LOCs are tabulated below in Tables 13, 14 and 15.

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Table 13. Risk Presumptions for Terrestrial Animals		
Risk Presumption	**RQ**	**LOC**
Birds:		
Acute Risk	EEC[1]/LC_{50} or LD_{50}/sqft[2] or LD_{50}/day[3]	≥0.5
Acute Restricted Use	EEC/LC_{50} or LD_{50}/sqft or LD_{50}/day (or LD_{50} < 50 mg ai/kg)	≥0.2
Endangered Species	EEC/LC_{50} or LD_{50}/sqft or LD_{50}/day	≥0.1
Chronic Risk	EEC/NOAEC	≥1
Wild Mammals:		
Acute Risk	EEC/LC_{50} or LD_{50}/sqft or LD_{50}/day	≥0.5
Acute Restricted Use	EEC/LC_{50} or LD_{50}/sqft or LD_{50}/day (or LD_{50} < 50 mg ai/kg)	≥0.2
Endangered Species	EEC/LC_{50} or LD_{50}/sqft or LD_{50}/day	≥0.1
Chronic Risk	EEC/NOAEC	≥1

[1] EEC=abbreviation for Estimated Environmental Concentration (mg ai/kg) on avian/mammalian food items

[2] $\frac{\text{mg/ft}}{LD_{50} * \text{wt. of bird}}$ [3] $\frac{\text{mg of toxicant consumed/day}}{LD_{50} * \text{wt. of bird}}$

Table 14. Risk Presumptions for Aquatic Animals		
Risk Presumption	**RQ**	**LOC**
Acute Risk	EEC[1]/LC_{50} or EC_{50}	≥0.5
Acute Restricted Use	EEC/LC_{50} or EC_{50}	≥0.1
Acute Endangered Species	EEC/LC_{50} or EC_{50}	≥0.05
Chronic Risk	EEC/NOAEC	≥1

[1] EEC = (mg ai/L or µg ai/L) in water

Table 15. Risk Presumptions for Plants		
Risk Presumption	**RQ**	**LOC**
Terrestrial Plants in Terrestrial and Semi-Aquatic Areas:		
Non-Endangered Species	EEC[1]/EC_{25}	≥1
Endangered Species	EEC/NOAEC or EC_{05}[3]	≥1
Aquatic Plants:		
Non-Endangered Species	EEC[2]/EC_{50}	≥1
Endangered Species	EEC/NOAEC or EC_{05}[3]	≥1

[1] EEC = lbs ai/acre [2] EEC = (µg ai/L or mg ai/L) in water

[3] An EC_{05} is only used as a surrogate when a valid NOAEC is not available.

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The following section presents the risk quotients calculated for emamectin benzoate and the LOCs (if any) that are exceeded. Further discussion of the risk quotients and uncertainties in the assessment is presented in D309154 and Appendix C.

1. Risks to Non-target Aquatic Animals and Plants

Animals – Acute Risk

Acute risk quotients (RQs) and levels of concern (LOCs) exceedances for aquatic animals and plants are presented in Table 16 below. A detailed discussion of the potential acute risk and uncertainties to aquatic animals and plants can be found in Appendix E and D309154.

Fish
No acute risk quotients for freshwater and estuarine/marine fish exceeded the Agency's LOCs; therefore, there is no indication of risk for fish from acute exposure to emamectin benzoate as a result of the proposed new uses.

Aquatic-phase Amphibians
EFED currently uses surrogate data (fish) for non-target aquatic amphibians. Fish risk data indicates that aquatic-phase amphibians are not at risk to adverse effects on survival from acute exposure to emamectin benzoate as a result of the proposed new uses.

Invertebrates
Based on the most conservative aquatic exposure scenario for emamectin benzoate, the peak EEC for the GA pecan scenario is 0.17 µg ai/L. Compared to the daphnid acute EC_{50} of 1.0 µg ai/L and mysid acute LC_{50} of 0.04 µg ai/L, the RQs are 0.17 and 4.3, respectively. For freshwater invertebrates, the restricted use and endangered species LOCs are exceeded for the GA pecan scenario and the endangered species LOC is exceeded for the OR filbert scenario. For estuarine/marine invertebrates, the acute risk, restricted use, and endangered species LOCs are exceeded for all scenarios. Consequently, aquatic invertebrates are potentially at risk to adverse effects on survival from acute exposure to emamectin benzoate as a result of the proposed new uses.

Plants – Risk

Aquatic plants
RQs for aquatic plants, both vascular and nonvascular species, did not exceed the Agency's LOCs; therefore, there is no indication of risk for aquatic plants from exposure to emamectin benzoate as a result of the proposed new uses.

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Table 16. Acute Risks to Aquatic Animals and Risks to Plants for Emamectin Benzoate Use on Pistachios and Tree Nuts Crop Group; 3 Air Blast Applications at 0.015 lb ai/A with 7 Days Reapplication Intervals

Taxon	Species	Toxicity Endpoint	EECs[1] (µg/L)	Acute RQ[2]	LOCs Exceeded[3]
Freshwater Fish	Rainbow trout	96-hr LC_{50} = 174 µg ai /L	GA: 0.17	<0.1	None
			OR: 0.05	<0.1	None
			CA: 0.02	<0.1	None
Freshwater Invertebrate	Water flea	48-hr EC_{50} = 1.0 µg ai/L	GA: 0.17	**0.17**	Restricted Use (0.1) and Endangered Species (0.05)
			OR: 0.05	**0.05**	Endangered Species (0.05)
			CA: 0.02	0.02	None
Marine / estuarine Fish	Sheepshead minnow	96-hr LC_{50} = 1430 µg ai/L	GA: 0.17	<0.1	None
			OR: 0.05	<0.1	None
			CA: 0.02	<0.1	None
Marine / estuarine Invertebrate	Estuarine / marine mysid	96-hr EC_{50} = 0.04 µg ai/L	GA: 0.17	**4.3**	Acute Risk (0.5), Restricted use (0.1), and Endangered Species (0.05)
			OR: 0.05	**1.3**	Acute Risk (0.5), Restricted use (0.1), and Endangered Species (0.05)
			CA: 0.02	**0.5**	Acute Risk (0.5), Restricted use (0.1), and Endangered Species (0.05)
Vascular Plant	Duckweed	14-day EC_{50} >94 µg ai/L	GA: 0.17	<1.0	None
			OR: 0.05	<1.0	None
			CA: 0.02	<1.0	None
		14-day NOAEC = 94 µg ai/L	GA: 0.17	<1.0	None
			OR: 0.05	<1.0	None
			CA: 0.02	<1.0	None
Non-Vascular Plant	Freshwater Green algae	5-day EC_{50} >3.9 µg ai/L	GA: 0.17	<1.0	None
			OR: 0.05	<1.0	None
			CA: 0.02	<1.0	None
		5-day NOAEC = 3.9 µg ai/L	GA: 0.17	<1.0	None
			OR: 0.05	<1.0	None
			CA: 0.02	<1.0	None

[1] Based on peak EECs of the 3 scenarios (See table 6).
[2] Acute Risk Quotients are calculated using the following formula: Peak EEC/LC_{50}.
[3] Acute LOC for aquatic animals ≥0.05 for endangered species, ≥0.1 for restricted use and ≥0.5 for acute risk; LOC for aquatic plants ≥1; values in bold are LOC exceedances.

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Animals – Chronic Risk

Chronic RQs and LOC exceedances for fish and invertebrates are presented in Table 17 below. A detailed discussion of the potential chronic risk and uncertainties to aquatic animals and plants can be found in Appendix E and D309154.

Fish
Chronic risk quotients for freshwater and estuarine/marine fish did not exceed the Agency's LOCs; therefore, there is no indication of risk for fish from chronic exposure to emamectin benzoate as a result of the proposed new uses.

Aquatic-phase Amphibians
EFED currently uses surrogate data (fish) for non-target aquatic amphibians. Fish risk data indicates that aquatic-phase amphibians are not at risk to adverse effects on reproduction or growth from chronic exposure to emamectin benzoate as a result of the proposed new uses.

Invertebrates
Based on the most conservative aquatic exposure scenario for emamectin benzoate, the 21-day EEC for the GA pecan scenario is 0.045 µg ai/L. Compared to the daphnid chronic NOAEC of 0.088 µg ai/L and mysid chronic NOAEC of 0.0087 µg ai/L, the RQs are 0.51 and 5.5, respectively. For estuarine/marine invertebrates, the chronic risk and endangered species LOC is exceeded for all scenarios; while, there is no LOC exceedance for chronic risk to freshwater invertebrates for all scenarios.

Table 17. Chronic Risks to Aquatic Animals for Emamectin Benzoate Use on Pistachios and Tree Nuts Crop Group; 3 Applications at 0.015 lb ai/A with 7 Days Reapplication Intervals

Taxon	Species	Toxicity Endpoint	EECs[1] (µg/L)	Chronic RQ[2]	LOCs Exceeded[3]
Freshwater Fish	Fathead minnow	32-day NOAEC = 6.5 µg ai/L	GA: 0.045	<0.1	None
			OR: 0.02	<0.1	None
			CA: 0.01	<0.1	None
Freshwater Invertebrate	Water flea	21-day NOAEC = 0.088 µg ai/L	GA: 0.048	0.51	None
			OR: 0.025	0.28	None
			CA: 0.01	0.11	None
Marine/estuarine Fish	None	NOAEC = 30 µg ai/L[4]	GA: 0.045	<0.1	None
			OR: 0.02	<0.1	None
			CA: 0.01	<0.1	None
Marine/estuarine Invertebrate	Estuarine / marine mysid	28-day NOAEC = 0.0087 µg ai/L	GA: 0.048	**5.5**	Chronic Risk (1.0)
			OR: 0.025	**2.9**	Chronic Risk (1.0)
			CA: 0.01	**1.1**	Chronic Risk (1.0)

[1] Based on 21 day EECs for invertebrates and 60 day EECs for fish (See table 6)
[2] Chronic Risk Quotients are calculated using the following formula: 60-day EEC/NOAEC (fish); 21-day EEC/NOAEC (invertebrates).
[3] Chronic LOC for aquatic animals ≥1; values in bold are LOC exceedances.
[4] Estimated via acute to chronic ratio.

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2. Risks to Non-Target Terrestrial Animals and Plants

Animals – Acute Risks

Acute risk quotients (RQs) and levels of concern (LOCs) exceedances for terrestrial animals and plants are presented in Tables 18 and 19 below. A detailed discussion of the potential acute risk and uncertainties to terrestrial animals and plants can be found in Appendix D and D309154.

Birds – dose-based exposures
Acute RQs and LOC exceedances for birds on a dose basis are presented in Table 18. For dose-based exposures, the restricted use LOC was exceeded for small birds that forage on short grass. In addition, the endangered species LOC was exceeded for small-sized birds that consume tall grass, broadleaf plants, and small insects and for medium-sized birds that consume short grass. The LOC was not exceeded for large-sized birds (1000-gram). These exceedances indicate that small- and medium-sized birds may be at risk to adverse effects on survival from exposure to emamectin benzoate as a result of the proposed new uses.

Table 18. Avian Acute Risk Quotients Based on Dose-based EECs (mg/kg-bw) for Small (20-gram), Medium (100-gram), and Large (1000-gram) Birds and a LD_{50} of 46 mg/kg-bw in the Mallard Duck.

Food Item	Size of Bird (grams)	Adjusted LD_{50} (mg ai/kg-bw)[1]	Dose-Based EECs (mg/kg-bw)[2]	Risk Quotient[3]	LOC Exceedance[4]
Short grass	20	24	6.83	**0.29**	Restricted Use (0.2)
	100	30	3.9	**0.13**	Endangered Species (0.1)
	1000	43	1.74	0.04	None
Tall grass	20	24	3.13	**0.13**	Endangered Species (0.1)
	100	30	1.79	0.06	None
	1000	43	0.8	0.02	None
Broadleaf plants/small insects	20	24	3.84	**0.16**	Endangered Species (0.1)
	100	30	2.19	0.07	None
	1000	43	0.98	0.02	None
Fruits, pods, large insects	20	24	0.43	0.02	None
	100	30	0.24	0.01	None
	1000	43	0.11	<0.01	None

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Table 18. Avian Acute Risk Quotients Based on Dose-based EECs (mg/kg-bw) for Small (20-gram), Medium (100-gram), and Large (1000-gram) Birds and a LD_{50} of 46 mg/kg-bw in the Mallard Duck.					
Food Item	**Size of Bird (grams)**	**Adjusted LD_{50} (mg ai/kg-bw)[1]**	**Dose-Based EECs (mg/kg-bw)[2]**	**Risk Quotient[3]**	**LOC Exceedance[4]**

[1] The acute oral toxic dose was adjusted for body weight based on the formula recommended by Mineau *et al.* 1996: Adj. $LD_{50} = LD_{50}\,(AW/TW)^{1-a}$: TW=weight of test organism (reference body weight of mallard duck is 2000 grams); AW = weight of assessed organism; $^{a} = 1.15$

[2] EECs were calculated by assuming that small, medium, and large birds consume 114%, 65%, and 29%, respectively, of their body weight daily.

[3] Acute Risk Quotients are calculated using the following formula: dose-based EEC/mg/kg-bw.

[4] Acute LOC for terrestrial animals: ≥0.1 for endangered species, ≥0.2 for restricted use and ≥0.5 for acute risk; values in bold are LOC exceedances

Birds – dietary-based exposures

Acute RQs and LOC exceedances for birds on a dietary basis are presented in Table 19. For dietary-based exposures, there were no acute LOC exceedances for birds foraging any of the food items assessed. Avian species are not at risk to adverse effects on survival from acute exposure to emamectin benzoate as a result of the proposed new uses.

Table 19. Avian Acute Risk Quotients Based on Dietary-based EECs (mg/kg-diet) for Birds and a LC_{50} of 570 mg/kg-diet in the Mallard Duck

Food Item	LC_{50} (mg/kg-diet)	Dietary Based EECs (mg/kg-diet)	Risk Quotient[1]	LOC Exceedance[2]
Short grass	570	6	0.01	None
Tall grass	570	2.75	<0.01	None
Broadleaf plants/small insects	570	3.37	0.01	None
Fruits, pods, large insects	570	0.37	<0.01	None

[1] Acute Risk Quotients are calculated using the following formula: dietary-based EEC/mg/kg-diet.

[2] Acute LOC for terrestrial animals: ≥0.1 for endangered species, ≥0.2 for restricted use and ≥0.5 for acute risk; values in bold are LOC exceedances

Mammals – dose-based exposures

Acute RQs and LOC exceedances for mammals on a dose basis are presented in Table 20 below. For dose-based exposures, the Agency's Restricted Use and Endangered Species LOCs were exceeded for 15 g and 35 g mammals that forage on short grass. The Endangered Species LOC was exceeded for 1000 g mammals that forage on short grass, for 15 g mammals that forage on tall grass and for 15 g and 35 g mammals that forage on broadleaf plants and small insects. These exceedances indicate that herbivore and insectivore mammals may be at risk to adverse effects on growth and reproduction from chronic exposure to emamectin benzoate as a result of the proposed new uses and will be discussed in the Risk Description section. On the other hand,

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there are no LOC exceedances for large mammals foraging any of the food items assessed or mammals of all classes foraging fruit, pods, large insects, and seeds.

Table 20. Mammalian Acute Risk Quotients Based on Dose-based EECs (mg/kg-bw) for Small (15-gram), Medium (35-gram), and Large (1000-gram) Mammals and a LD_{50} of 22 mg/kg-bw in the Laboratory Mouse.

Food Item	Size of Mammal (grams)	Adjusted LD_{50} (mg ai/kg-bw)[1]	Dose-based EEC (mg/kg-bw)[2]	Risk Quotient[3]	LOC Exceedance[4]
Short grass	15	23.6	5.72	**0.24**	Restricted Use (0.2) and Endangered Species (0.1)
	35	19.1	3.95	**0.21**	Restricted Use (0.2) and Endangered Species (0.1)
	1000	8.3	0.92	**0.11**	Endangered Species (0.1)
Tall grass	15	23.6	2.62	**0.11**	Endangered Species (0.1)
	35	19.1	1.81	0.09	None
	1000	8.3	0.42	0.05	None
Broadleaf plants, small insects	15	23.6	3.22	**0.14**	Endangered Species (0.1)
	35	19.1	2.22	**0.12**	Endangered Species (0.1)
	1000	8.3	0.52	0.06	None
Fruits, pods, large insects	15	23.6	0.36	0.02	None
	35	19.1	0.25	0.01	None
	1000	8.3	0.06	<0.01	None
Seed (granivores)	15	23.6	0.08	<0.01	None
	35	19.1	0.05	<0.01	None
	1000	8.3	0.01	<0.01	None

[1] The acute oral toxic dose was adjusted for body weight based on the formula recommended by Mineau *et al.* 1996:Adj. $LD_{50} = LD_{50}\ (TW/AW)^{0.25}$: TW=weight of test organism (reference body weight of adult mouse is ≈20 grams); AW = weight of assessed organism.

[2] EECs were calculated by assuming that small, medium, and large mammals consume 95%, 66%, and 15% of their body weight daily.

[3] Acute Risk Quotients are calculated using the following formula: dose-based EEC/ mg/kg-bw.

[4] Acute LOC for terrestrial animals: ≥0.1 for endangered species, ≥0.2 for restricted use and ≥0.5 for acute risk; values in bold are LOC exceedances.

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Animals – Chronic Risks

Chronic risk quotients (RQs) and levels of concern (LOCs) exceedances for terrestrial animals are presented in Tables 21, 22, and 23 below. A detailed discussion of the potential chronic risk and uncertainties to terrestrial animals and plants can be found in Appendix D and D309154.

Birds – dietary-based exposures
Chronic RQs and LOC exceedances for birds on a dietary basis are presented in Table 21 below. For dietary-based exposures, the Agency's chronic risk and endangered species LOC was not exceeded for birds that forage on all food items assessed at the most conservative terrestrial exposure scenario. Consequently, birds are not at risk to adverse effects on growth and reproduction from chronic exposure to emamectin benzoate as a result of the proposed new uses.

Table 21. Avian Chronic Risk Quotients Based on Dietary-based EECs (mg/kg-diet) and a Reproduction NOAEC of 40 mg/kg-diet in the Mallard Duck

Food Item	NOAEC (mg/kg-diet)	Dietary-based EECs (mg/kg-diet)	Risk Quotient	LOC Exceedance
Short grass	40	6	0.15	None
Tall grass	40	2.75	0.07	None
Broadleaf plants/small insects	40	3.37	0.08	None
Fruits, pods, large insects	40	0.37	0.01	None

[1] Chronic Risk Quotients are calculated using the following formula: dietary-based EEC/mg/kg-diet.
[2] Chronic LOC for terrestrial animals: ≥1.0 for chronic risk and endangered species; values in bold are LOC exceedances

Mammals – dose-based exposures
Chronic RQs and LOC exceedances for mammals on a dose basis are presented in Table 22 below. For dose-based exposures, the Agency's chronic risk and endangered species LOC was exceeded for small, medium, large-sized herbivores and insectivores that forage on all food items assessed except fruits, pods, and large insects and 1000 g mammals foraging tall grass at the maximum application rate (0.015 lb ai/A). The highest RQ was 4.34 (small mammals that forage on short grass). The chronic LOC was not exceeded for granivores that forage on seeds. These exceedances indicate that small-, medium-, and large-sized herbivores and insectivores may be at risk to adverse effects on growth and reproduction from chronic exposure to emamectin benzoate as a result of the proposed new uses.

Table 22. Mammalian Chronic Risk Quotients Based on Dose-based EECs (mg/kg-bw) for Small (15-gram), Medium (35-gram), and Large (1000-gram) Mammals and a NOAEL of 0.6 mg/kg-bw in the Laboratory Mouse.

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Food Item	Size of Mammal (grams)	Adjusted NOAEL (mg ai/kg-bw)[1]	Dose-based EEC (mg/kg-bw)[2]	Risk Quotient[3]	LOC Exceedance[4]
Short grass	15	1.3	5.72	**4.34**	Chronic Risk and Endangered Species (1.0)
	35	1.07	3.95	**3.7**	Chronic Risk and Endangered Species (1.0)
	1000	0.46	0.92	**1.99**	Chronic Risk and Endangered Species (1.0)
Tall grass	15	1.3	2.62	**1.99**	Chronic Risk and Endangered Species (1.0)
	35	1.07	1.81	**1.7**	Chronic Risk and Endangered Species (1.0)
	1000	0.46	0.42	0.9	None
Broadleaf plants, small insects	15	1.3	3.22	**2.44**	Chronic Risk and Endangered Species (1.0)
	35	1.07	2.22	**2.08**	Chronic Risk and Endangered Species (1.0)
	1000	0.46	0.52	**1.12**	Chronic Risk and Endangered Species (1.0)
Fruits, pods, large insects	15	1.3	0.36	0.27	None
	35	1.07	0.25	0.23	None
	1000	0.46	0.06	0.12	None
Seed (granivores)	15	1.3	0.08	0.06	None
	35	1.07	0.05	0.05	None
	1000	0.46	0.01	0.03	None

[1] The NOAEL was adjusted for body weight based on the formula recommended by Mineau *et al.* 1996:Adj. $NOAEL_{adj}$ = NOAEL $(TW/AW)^{0.25}$: TW=weight of test organism (reference body weight of adult rat is ≈350 grams); AW = weight of assessed organism.

[2] EECs were calculated by assuming that small, medium, and large mammals consume 95%, 66%, and 15% of their body weight daily.

[3] Chronic Risk Quotients are calculated using the following formula: dose-based EEC/ mg/kg-bw.

[4] Chronic LOC for terrestrial animals: ≥1.0 for chronic risk and endangered species; values in bold are LOC exceedances.

Mammals – dietary-based exposures

Chronic RQs and LOC exceedances for mammals on a dietary basis are presented in Table 23. For dietary-based exposures, the Agency's chronic risk and endangered species LOC was not

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exceeded for mammals that forage on all food items assessed at the most conservative terrestrial exposure scenario. Consequently, mammals are not at risk to adverse effects on growth and reproduction from chronic exposure to emamectin benzoate as a result of the proposed new uses.

Table 23. Mammalian Chronic Risk Quotients Based on Dietary-based EECs (mg/kg-diet) and a NOAEC of 12 mg/kg-diet in the Laboratory Mouse

Food Item	NOAEC (mg/kg-diet)	Dietary-based EECs (mg/kg-diet)	Risk Quotient	LOC Exceedance
Short grass	12	6	0.5	None
Tall grass	12	2.75	0.23	None
Broadleaf plants/small insects	12	3.37	0.28	None
Fruits, pods, large insects	12	0.4	0.03	None

[1] Chronic Risk Quotients are calculated using the following formula: dietary-based EEC/mg/kg-diet.
[2] Chronic LOC for terrestrial animals: ≥1.0 for chronic risk and endangered species; values in bold are LOC exceedances

Beneficial Insects
EFED does not quantitatively estimate risk to beneficial insects. The submitted acute contact study indicate that emamectin benzoate is categorized as very highly toxic to honeybees (LD_{50} = 0.0035 µg ai/bee). In addition, the residue on foliage study indicates ememactin benzoate remains lethal to honeybees for 8 to 24 hours post-application. Consequently, precautionary labeling is required to protect beneficial insects from emamectin benzoate exposures.

Plants – Risks

Terrestrial plants
There are no toxicity data available for terrestrial plants; thus, the potential risk of emamectin benzoate to monocots and dicots could not be quantitatively estimated. Until toxicity data are available, the potential risks to terrestrial plants are uncertain and cannot be precluded until data indicate otherwise. The value of toxicity studies with seedling emergence (Guideline 850.4100) and vegetative vigor (Guideline 850.4150) would be in determining risks or uncertainties to monocots and dicots including defining an action area for endangered species. Risk mitigation strategies (*e.g.*, determining maximum emamectin benzoate application rate that results in an RQ below the LOC) cannot be evaluated without these data.

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B. Risk Description - Interpreting the Risk Quotients

The risk hypothesis states that the use of emamectin benzoate as an insecticide for terrestrial food use sites has the potential to compromise survivorship, reproduction, and/or growth of non-target aquatic and terrestrial animals and plants, including Federally-listed endangered and threatened species. Key findings of this risk hypothesis are as follows:

1. Risks to Aquatic Animals and Plants

Aquatic

The presumption of acute risk to freshwater invertebrates and acute and chronic risk to estuarine/marine invertebrates is supported by this risk assessment. The presumption of acute and chronic risks to freshwater and estuarine/marine fish, including aquatic-phase amphibians, chronic risk to freshwater invertebrates and risk to aquatic plants are not supported by the results of this baseline risk assessment.

2. Risks to Terrestrial Animals and Plants

Terrestrial

Based on the available ecotoxicity data and predicted environmental exposures, this ecological risk assessment on the proposed new uses of emamectin benzoate on tree nuts crop group and pistachios supports the presumption of acute risk to 20 g birds that forage on short grass, tall grass, broadleaf plants, and small insects. Risk is also anticipated for 100 g birds that forage on short grass. Consequently, based on the use of surrogate data (birds), acute risks to terrestrial-phase amphibians and reptiles is supported by the results of this baseline risk assessment. Chronic risk to birds, terrestrial-phase amphibians, and reptiles is expected to be minimal. The presumption of acute risk to mammals of all weight classes that forage on short grass, for 15 g and 35 g mammals that forage on broadleaf plants and small insects and for 15 g mammals that forage on tall grass is supported by this risk assessment. Chronic risk to 15, 35, 1000 g body weights mammals assessed that forage on all food items assessed except fruits, pods, and large insects is presumed for these proposed new uses of emamectin benzoate.

Toxicity data were not available to evaluate the potential risk of emamectin benzoate to terrestrial plants, the potential risk to non-target and endangered terrestrial plants cannot be precluded at this time and assumed to be directly affected until data is available.

3. Review of Incident Data

The National Pesticide Information Center (NPIC) prepares summaries of information provided by individuals who have contacted the NPIC for information or to report a pesticide incident. None of this information has been verified or substantiated by independent investigations of NPIC staff, laboratory analysis, or any other means. Thus, if a person alleges/reports a pesticide incident, it will likely be recorded as an incident by NPIC. NPIC qualifies the information by assigning a Certainty Index (CI), which is an indication of the degree of certainty that an incident that the purported incident was related to a pesticide exposure. CIs, range from 1 = "unrelated" to 4 = "highly probable". NPIC makes no claims or guarantees as to the accuracy of the CI or

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other information presented in its reports, other than that NPIC has done its best to accurately document/record the information provided to NPIC. In addition, FIFRA 6(a)(2) incident data add lines of evidence to risk predictions from the baseline assessment thus supporting the risk predictions with actual effects in the field.

Up to date, there are no incidents related to emamectin benzoate recorded in the Ecological Incident Information System (EIIS) as of June 20, 2008.

4. Endocrine Effects

EPA is required under the Federal Food, Drug, and Cosmetic Act (FFDCA), as amended by the Food Quality Protection Act (FQPA), to develop a screening program to determine whether certain substances (including all pesticide active and other ingredients) "*may have an effect in humans that is similar to an effect produced by a naturally occurring estrogen, or other such endocrine effects as the Administrator may designate.*" Following the recommendations of its Endocrine Disruptor Screening and Testing Advisory Committee (EDSTAC), EPA determined that there was a scientific basis for including, as part of the program, the androgen and thyroid hormone systems, in addition to the estrogen hormone system. EPA also adopted EDSTAC's recommendation that the Program include evaluations of potential effects in wildlife. For pesticide chemicals, EPA will use the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and, to the extent that effects in wildlife may help determine whether a substance may have an effect in humans, FFDCA authority to require the wildlife evaluations. As the science develops and resources allow, screening of additional hormone systems may be added to the Endocrine Disruptor Screening Program (EDSP). When the appropriate screening and/or testing protocols being considered under the Agency's EDSP have been developed, emamectin benzoate may be subjected to additional screening and/or testing to better characterize effects related to endocrine disruption.

Emamectin benzoate may indicate endocrine-related effects following exposure since neurotoxic effects of lower limb weakness, reduced reaction to external stimuli, loss of coordination, depression, lethargy, wing droop, and loss of righting reflex in birds and tremors and ataxia in mammals occurred at concentrations lower than the reproduction effects. The reproduction effects observed in mammal studies were decreased fecundity and fertility indices.

5. Federally Threatened and Endangered (Listed) Species Concern

The threatened and endangered species that are presumed to be potentially at risk from this proposed new use of emamectin benzoate on tree nuts crop group and pistachios include aquatic invertebrates, birds (surrogate for reptiles and terrestrial-phase amphibians), mammals, beneficial insects, and terrestrial plants. The Agency considers a potential for not only direct effects, but also adverse effects to those listed species that rely on these taxa. Further analysis regarding the overlap of individual species with each use site is required prior to determining the likelihood of potential impact to listed species. Such a refinement includes obtaining better toxicity information to assess higher exposure levels, and is outlined in the following sections.

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a. Action Area

For listed species assessment purposes, the action area is considered to be the area affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. At the initial baseline level, the risk assessment considers broadly described taxonomic groups and so conservatively assumes that listed species within those broad groups are co-located with the pesticide treatment area. This means that terrestrial plants and wildlife are assumed to be potentially located on or adjacent to the treated site and aquatic organisms are assumed to be potentially located in a surface water body adjacent to the treated site. The assessment also assumes that the listed species are located within an assumed area and during periods of exposure, which has the relatively highest potential exposure to the pesticide, and that exposures are likely to decrease with distance from the treatment area and with time within or near the treated area.

If the assumptions associated with the baseline action area result in RQs that are below the listed species LOCs, or exposure is unlikely to cause effects for a given taxa, a "no effect" determination conclusion is made with respect to listed species in that taxa, and no further refinement of the action area is necessary. Furthermore, RQs below the listed species LOCs for a given taxonomic group indicate no concern for indirect effects upon listed species that depend upon the taxonomic group covered by the RQ as a resource. However, in situations where the baseline assumptions lead to RQs in excess of the listed species LOCs for a given taxonomic group or the data preclude making such a determination, a "may affect" designation cannot be precluded and may be associated with direct effects on listed species belonging to that taxonomic group or may extend to indirect effects upon listed species that depend upon that taxonomic group as a resource. In such cases, additional information on the biology of listed species, the locations of these species, and the locations of use sites need to be considered along with available information on the fate and transport properties of the pesticide to determine the extent to which baseline assumptions regarding an action area apply to a particular listed organism. These subsequent refinement steps could consider how this information would impact the action area for a particular listed organism and may potentially include areas of exposure that are downwind and downstream of the pesticide use site.

b. Taxonomic Groups Potentially at Risk

For the proposed new use of emamectin benzoate on tree nuts crop group and pistachios, risk quotients (RQs) calculated based on this ecological risk assessment indicate potential risk to listed freshwater invertebrates, estuarine/marine invertebrates, birds (and terrestrial-phase amphibians and reptiles), mammals. In addition, a qualitative analysis indicates that this use poses a potential risk to listed beneficial insects. Data are not available to evaluate the risk of emamectin benzoate to terrestrial plants; consequently, the potential risk to listed terrestrial plants is uncertain and cannot be precluded this time until data are available. Emamectin benzoate is registered as an insecticide; there is presumably considerable risk concern to listed insects and arachnids located where emamectin benzoate is used.

However, emamectin benzoate does not exceed the endangered species LOC for 1000-gram

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birds, freshwater and estuarine/marine fish, and aquatic plants.

c. Indirect Effects Analysis

Because of the potential risks to freshwater invertebrates, estuarine/marine invertebrates, birds (and terrestrial-phase amphibians and reptiles), mammals, beneficial insects, arachnids, and terrestrial plants, the Agency acknowledges a potential for indirect effects on those listed species that rely on these taxa for some important aspect of their life cycle. The extent to which the use of emamectin benzoate on tree nuts crop group and pistachios will indirectly affect listed species will require identification of listed species that co-occur in areas of emamectin benzoate use and an evaluation of critical habitat as described below. The Agency cannot preclude the possibility of a 'may affect' designation for listed species based on this assessment.

d. Critical Habitat

The baseline risk assessment has identified potential concerns for direct and indirect effects on listed species associated with action areas where tree nuts crop group and pistachios might be treated with emamectin benzoate. In light of the potential for effects on listed species, the next step is to collect the necessary toxicity information and then, if potential for effects remains, EPA and the Service(s) would refine this assessment to identify which listed species and critical habitat are potentially implicated. Analytically, the identification of such species and critical habitat can occur in either of two ways. First, the agencies could determine whether the action area overlaps critical habitat or the occupied range of any listed species. If so, EPA would examine whether the pesticide's potential impacts on non-endangered species would affect the listed species indirectly or directly affect a constituent element of the critical habitat. Alternatively, the agencies could determine which listed species depend on biological resources, or have constituent elements that fall into the taxa that may be directly or indirectly impacted by the pesticide. Then EPA would determine whether use of the pesticide overlaps the critical habitat or the occupied range of those listed species. At present, the information reviewed by EPA does not permit use of either analytical approach to make a definitive identification of species that are potentially impacted indirectly or critical habitats that is potentially impacted directly by the use of the pesticide. EPA and the Service(s) are working together to conduct the necessary analysis.

e. Direct Effect Co-occurrence Analysis

The Endangered Species LOC for birds, mammals, reptiles, and terrestrial-phase amphibians, and freshwater and estuarine/marine invertebrates is exceeded for the proposed new uses of emamectin benzoate on tree nuts crop group and pistachios. In addition, there are concerns for terrestrial plants, arachnids, and beneficial insects; LOCATES was run for all listed terrestrial animals and plants and aquatic invertebrates to determine the potential for co-occurrence of listed animal and plant species location with areas of expected pesticide use. When baseline assessment information suggests that a listed species occurs in counties where a pesticide is used, there is a potential for a direct effect from emamectin benzoate use, should exposure actually occur. The animal taxa that reside in those areas, and the basis for the designation, are in

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Appendices E thru K. Additional analysis of listed animal and plants locations, refinement of the action area associated with emamectin benzoate regulatory decisions, and the biology of the potentially affected species would be needed before an effects determination can be made for any of the co-located species identified by this assessment.

LOCATES was used to preliminarily identify listed species that are located within the counties in USA where the proposed new uses of emamectin benzoate could be used. This analysis considered these animal taxonomic groups included (i.e. birds, mammals, reptiles, terrestrial-phase amphibians, terrestrial plants, insects, crustaceans, bivalves, gastropods, arachnids, and snails). The available baseline information allows a county-level analysis to identify species that could be potentially indirectly affected by emamectin benzoate effects on listed species from tree nuts crop group and pistachios uses in counties of USA. Such potential concerns are limited by the true potential for exposures of critical resources to modeled emamectin benzoate levels. LOCATES listed 265 endangered/threatened species for almonds, 119 species for filbert, 445 species for macadamia nut, 523 species for pecan, 256 species for pistachios, 345 species for walnuts, and 586 species for other nuts of the tree nuts crop group 14 found nationwide. Consequently, based on the information available, it is presumed listed species reside in areas of expected pesticide use (Table 24).

Table 24. Number of Listed Species Located in Tree Nuts Crop Group and Pistachio Areas in the United States of America.

Crop	Affected Counties	Affected States	No. of Species
Almonds	62	16	265
Filbert (hazelnut)	115	25	119
Macadamia nut (bush nut)	9	2	445
Pecan	1055	31	523
Pistachios	53	6	256
Walnut (black and English/Persian)	189	28	345
Nuts -Other	207	11	586

f. Indirect Effect Co-occurrence Analysis

The baseline risk quotients for birds, reptiles, mammals, terrestrial-phase amphibians, and freshwater and estuarine/marine invertebrates exceed the LOC for endangered species and also lead to concerns for terrestrial plants, arachnids, and beneficial insects. In accordance with established procedures such findings suggest a potential concern for indirect effects to listed animal and plant species with both narrow (i.e., species that are obligates or have very specific habitat or feeding requirements) and general dependencies (i.e., cover type requirements) on plants or animals as a resource or important habitat component. LOCATES was used to preliminarily identify listed animal and plant species that are located within the counties in USA where emamectin benzoate could be used. This analysis considered all animal and plant taxonomic groups (i.e., mammals, birds, amphibians, reptiles, fish, crustaceans, bivalves, gastropods, arachnids, insects, dicots, monocots, ferns, conf/cycds, and lichens) that eat those listed animal species; plants that requires pollinators or seed dispersers; species that require

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mammal or reptile burrows for shelter or breeding habitats; and aquatic animals and plant that require riparian vegetation for habitat, feeding, and cover requirements. The available baseline information allows a county-level analysis to identify species that could be potentially indirectly affected by emamectin benzoate effects on listed species from tree nuts crop group and pistachios uses in counties of USA. The animal and plant species that reside in those areas, and the basis for the designation, are summarized in Table 25, below. Such potential concerns are limited by the true potential for exposures of critical animal and plant species resources to modeled emamectin benzoate levels and the relationship between 'directly effected' listed species and 'indirectly effected' listed species. Consequently, additional analysis of listed species locations, refinement of the action area associated with emamectin benzoate regulatory decisions, and the biology of the potentially affected species would be needed before an effects determination can be made for any of the co-located species identified by this assessment for potential indirect effects.

Table 25. Listed Taxonomic Groups Potentially at Risk for Direct or Indirect Effects as a Result of Emamectin Benzoate Applications *(Applications are for Food Uses where Tree Nuts Crop Group and Pistachios are grown Nationwide).*

Listed Taxon	Direct Effects	Basis for Direct Effects Concern	Indirect Effects	Basis for Indirect Effects Concern
Terrestrial and Semi-Aquatic Plants – monocots and dicots	Yes	Toxicity data are not available for terrestrial plants exposed to emamectin benzoate. If terrestrial plants are sensitive to emamectin benzoate, there might be direct effects to terrestrial plants. Therefore, the risks to terrestrial plants from emamectin benzoate uses cannot be precluded at this time and are assumed directly affected.	Yes	Potential concerns for monocots and dicots that use birds, mammals, reptiles, and terrestrial-phase amphibians as pollinators or seed dispersers. If pollinators are directly affected by emamectin benzoate use, there might be indirect effects to terrestrial plants due to loss of pollinators for flower fertilization.
Beneficial Insects (Honeybees)	Yes	Precautionary labeling required.	Yes	Potential concerns for beneficial insects that depend on mammal or reptile burrows for habitat, feeding, or cover requirements. If wildlife burrows are directly affected, there might be indirect effects to beneficial insects due to loss of wildlife burrows for shelter.
Birds and Reptiles[1]	Yes	The endangered species LOC is exceeded.	Yes	Potential concerns for birds and reptiles that eat terrestrial and aquatic wildlife as a food resource and/or depend on burrows or plants for habitat, feeding, or cover requirements. If wildlife and plants are directly affected, there might be indirect effects to birds and reptiles due to loss of food and shelter.
Terrestrial-phase Amphibians[1]	Yes	The endangered species LOC is exceeded.	Yes	Potential concerns for terrestrial-phase amphibians that eat terrestrial and aquatic wildlife as a food source and/or depend on reptile burrows or plants for habitat, feeding, or cover requirements. If wildlife and plants are directly affected, there might be indirect effects to terrestrial-phase amphibians due to loss of food and shelter.

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Table 25. Listed Taxonomic Groups Potentially at Risk for Direct or Indirect Effects as a Result of Emamectin Benzoate Applications *(Applications are for Food Uses where Tree Nuts Crop Group and Pistachios are grown Nationwide).*

Listed Taxon	Direct Effects	Basis for Direct Effects Concern	Indirect Effects	Basis for Indirect Effects Concern
Mammals	Yes	The endangered species LOC is exceeded.	Yes	Potential concerns for mammals that eat terrestrial and aquatic wildlife as a food source and/or depend on reptile burrows or plants for habitat, feeding, or cover requirements. If wildlife and plants are directly affected, there might be indirect effects to mammals due to loss of food and shelter.
Freshwater and Estuarine/marine Invertebrates	Yes	The endangered species LOC is exceeded	Yes	Potential concerns for aquatic invertebrates that eat terrestrial and aquatic wildlife as a food source and/or depend on plants for habitat, feeding, or cover requirements. If wildlife and plants are directly affected, there might be indirect effects to aquatic invertebrates due to loss of cover and food.
Freshwater Fish and Aquatic-phase Amphibians[2]	No	No LOC exceedances	Yes	Potential concerns for freshwater fish and aquatic-phase amphibians that eat terrestrial and aquatic wildlife as a food source and/or depend on plants for habitat, feeding, or cover requirements. If wildlife and plants are directly affected, there might be indirect effects to freshwater fish and aquatic-phase amphibians due to loss of cover and food.
Estuarine / marine Fish	No	No LOC exceedances	Yes	Potential concerns for estuarine/marine fish that eat terrestrial and aquatic wildlife as a food source and/or depend on plants for habitat, feeding, or cover requirements. If wildlife and plants are directly affected, there might be indirect effects to estuarine/marine fish due to loss of cover and food.
Aquatic Vascular and Nonvascular Plants	No	No LOC exceedances	Yes	Potential concerns for aquatic plants that depend on pollinators and aquatic invertebrates for habitat, pollinating, feeding, or cover requirements. If wildlife and plants are directly affected, there might be indirect effects to aquatic plants due to loss of cover, pollen, and food.

1 Birds are used as surrogate species for terrestrial-phase amphibians and reptiles; therefore, potential direct and indirect effects to endangered avian, terrestrial-phase amphibians and reptilian species are considered equivalent.

3 Fish are used as a surrogate for aquatic phase amphibians; therefore, potential direct and indirect effects to endangered fish and aquatic-phase amphibian species are considered equivalent.

C. Description of Assumptions, Limitations, Uncertainties, Strengths and Data Gaps

Baseline risk assessments rely on labeled statements of the maximum rate of pesticide

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application, the maximum number of applications, and shortest interval between applications. Together, these assumptions constitute a maximum use scenario. The frequency at which actual uses approach these maximums is dependant on local pest pressure, resistance to the pesticide, timing of applications, and market forces.

a. Aquatic Assessment

Factors that may have led to an under-estimation of risk

The NOAEC used in the chronic estuarine/marine invertebrate assessment was from a study that may have underestimated toxicity. Test concentrations decreased by approximately 50% in the two measurements taken after Day 14 compared with the three measurements taken on or before Day 14. At the NOAEC of 0.0087 µg ai/L, mean emamectin benzoate concentrations 0.011 µg ai/L during the first 14 days (average of Day 1, 7, and 14) of the study and were 0.0049 µg ai/L during the last 14 days of the study (average of Days 23 and 28). Therefore, it is possible that adverse effects may have occurred if the exposure concentrations had been maintained throughout the study. For this reason, 0.0049 is considered a lower bound NOAEC. A chronic risk quotient based on this lower bound NOAEC in mysid would be 10, compared with a risk quotient of 5 presented in this assessment.

An important data gap in the aquatic risk assessment is that emamectin benzoate is expected sorb to the sediment and has been shown to be toxic to insects and aquatic invertebrates. For this reason, submission of sediment organism toxicity data would be of high value to this assessment.

Factors that may have led to an over-estimation of risk

It is likely that this assessment overestimates risk to estuarine/marine species because the proposed label mandates a 150 foot (aerial) or 25 foot (ground) buffer strip between the site of application and marine/estuarine water bodies. Outside of spray drift, EFED's current surface water models do not allow for an adjustment of EECs in water bodies based on different sized buffer zones. The previous assessment on pome fruits indicates complete elimination of spray drift did not result in reduction of LOCs below levels of concern for saltwater invertebrates (mysid shrimp). Given the low mobility of emamectin benzoate in soil, however, this buffer zone will likely reduce the amount of emamectin benzoate that is expected to enter water provided that it is exposed to sunlight to allow for photodegradation.

Factors that may have led to an under- or over-estimation of risk

The effect of pH on toxicity of emamectin is uncertain. Solubility and hydrophobicity of emamectin was greatly influenced by pH. Therefore, toxicity may also be affected by pH, and no data evaluating the potential relationship between pH and toxicity have been submitted.

A small number of surrogate species were used in this screening level risk assessment. It is not possible to determine whether the species tested are more or less sensitive than species that may be exposed to emamectin benzoate. Also, it was assumed that fish are approximately as sensitive

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as aquatic phase amphibians. However, no data are available to support this conclusion.

b. Terrestrial Assessment

Factors that may have led to an under-estimation of risk

Although emamectin benzoate has been shown to dissipate from foliage relatively rapidly, it also enters the plant where it forms a reservoir. This reservoir provides extended efficacy, but may also result in increased potential for exposure to the pesticide. Emamectin may persist when it is attenuated from sunlight. Therefore, potential for exposure may be extended in some locations.

The acute risk assessment in birds and mammals was based on lethality. However, in some of these studies, emamectin benzoate induced clinical signs of neurotoxicity at all doses tested. In birds, these effects included lower limb weakness, reduced reaction to external stimuli, loss of coordination, depression, lethargy, wing droop, ruffled appearance, prostrate posture, loss of righting reflex, trembling, convulsions, lower limb rigidity, muscle fasciculations, and lacrimation. In mammals, clinical signs of neurotoxicity included tremors and ataxia after acute exposure. These toxic responses could affect an animals' ability to survive in the wild. For example, loss of coordination or reduced reaction to external stimuli could affect an animal's ability to escape predation.

Factors that may have led to an over-estimation of risk

The mammalian acute toxicity value used in this risk assessment is the LD_{50} in male mice of 22 mg/kg-bw. The strain of mouse used in this assessment (CF-1) is uniquely sensitive to emamectin benzoate-induced neurotoxicity. Many members of this strain inherit an inability to produce a p-glycoprotein that most strains and species produce. This protein functions to resist the entrance of avermectin-type compounds into the central nervous system. P-glycoprotein is also present in the gut of most species and limits absorption of avermectin-type compounds following oral exposure. Therefore, the use of an LD50 from CF-1 mice could result in an overestimation of potential toxicity and risk to non-target mammals.

The LD_{50} is considered a more appropriate measure of toxicity for a highly toxic chemical such as emamectin (LD_{50} <50 mg/kg-bw). However, dietary risk quotients based on the lowest 5-day LC_{50} of 574 mg ai/kg-diet were <0.02; therefore, LOCs were not exceeded based on risk quotients calculated using the LC_{50}.

Factors that may have led to an over- or under-estimation of risk

In the absence of toxicity data in reptiles and amphibians, it was assumed that reptiles and terrestrial-phase amphibians are not more sensitive than birds and aquatic phase amphibians are not more sensitive than fish to emamectin benzoate toxicity. However, absence of toxicity data in reptiles and amphibians precludes evaluation of this assumption.

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Generic Assumptions and Limitations Related to Exposure for Aquatic Species

(1). Location of Species and Receiving Waters to Treated Field.

As discussed earlier in the aquatic exposure section of this document, OPP's screening risk assessment assumes that the modeled water body is adjacent to the treated field. A possible case-specific modification to this assumption of adjacent location of the water body may be a downwind offset of the water body if spray drift buffers are included in the proposed product labeling. For screening-level risk assessment purposes, the actual habitat requirements of any particular aquatic species are not considered. Instead an assumption is made that unspecified aquatic listed fish and invertebrate species occupy, exclusively and permanently, the water body being modeled. With the possible exception of scenarios where pesticides are directly applied to water, it is assumed that no habitat use considerations specific for any species would place the organisms in closer proximity to pesticide use sites. An assumption of exclusive and permanent occupation of a modeled site represents the highest possible screening assumption of frequency within a treated or exposed area.

(2). Exposure for Aquatic Species Is Through the Dissolved Phase

For water column species, an assumption is made that the greatest bioavailable fraction of pesticide in surface waters is that which occurs as freely dissolved in the water column. Additional chemical exposure from materials associated with suspended solids or those associated with food items is not considered. In most currently registered pesticide cases, solids adsorption and bioconcentration occurs at lower levels than would be expected for such classically persistent bioaccumulative compounds as dioxins, halogenated biphenyls, some organochlorine pesticides, and some organometallics. The extent to which consideration of exposures to pesticide from suspended solids and diet is not quantified by the Agency and in situations where RQS fall close to the endangered species LOCs, the potential for additional exposure from these routes may be a limitation of the screening assessment.

(3). Dissipation in the Modeled Water Body

Mass transport losses of pesticide from the modeled water body, except for losses by volatilization, degradation and sediment partitioning, are not considered. Consequently, the current modeled water body is assumed to capture all mass of pesticide entering as runoff, drift, and erosion-associated material. It is also assumed that pesticide mass is never lost from the water body by overtopping or flow-through, nor is concentration reduced by dilution. In total, these assumptions lead to a near maximum possible aqueous concentration. The current water body model does not account for any potential to concentrate pesticide through the evaporative loss of water. This limitation may have the greatest impact on the model's predictive ability for shallow water bodies, particularly vernal pools and potholes, where high surface-to-volume ratios of the water body accentuate the rate of evaporative loss and where the pesticide has low rates of degradation and volatilization. OPP is evaluating other models that will consider variations in water body volume and consider the effect of evaporative loss on concentrations of the pesticide and expects to present them to the SAP in 2004. As the Services research on the

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characteristics of vernal pools advances, the Agency and the Services will collaborate in developing future models for these exposure scenarios.

(4). Averaging Times for Aquatic Exposure

For an acute risk assessment there is no averaging time for exposure. An instantaneous peak concentration, with a 1 in 10 year return frequency, is assumed. The use of the instantaneous peak assumes that instantaneous exposure is of sufficient duration to elicit acute effects comparable to those observed over more protracted exposure periods tested in the laboratory, typically 48 to 96 hours. In the absence of data regarding time-to-toxic event analyses and latent responses to instantaneous exposure, the degree to which risk is overestimated cannot be quantified. For chronic exposure risk assessments, the averaging times considered for exposure are commensurate with the duration of invertebrate life-cycle or fish-early life stage tests (21-28 days for invertebrates and 56-60 days for fish). Response profiles (time to effect and latency of effect) to pesticides likely vary widely with mode of action and with species and should be evaluated on a case-by-case basis as available data allow. Nevertheless, because the Agency relies on chronic exposure toxicity endpoints based on a finding of no observed effect, the potential for any latent toxicity effects or averaging time assumptions to alter the conclusions of an acceptable chronic risk assessment prediction is limited. The extent to which modeled durations of aqueous concentrations over- or underestimate actual exposure scenarios depends on such factors as localized meteorological conditions, runoff characteristics of the watershed (soils and topography), the hydrological characteristics of receiving waters, the fate characteristics of the pesticide active ingredient, and the method of pesticide application. It should be noted that chronic effects studies are performed using a method that holds water concentrations in a steady state. This method is not likely to reflect conditions associated with pesticide runoff. Over the course of a typical run of the aquatic exposure models, pesticide estimated concentrations increase and decrease in surface water on a cycle influenced by rainfall events and degradation rates.

(5). A Well-Mixed Pond

Because the EXAMS model assumes instantaneous equilibrium and mixing, it does not consider the potential for higher short-term concentrations in the areas of the pond initially receiving pesticide runoff (e.g., the shallow, near-shore areas of the pond) and drift (e.g., the near-surface layer of the pond). It is possible that concentrations immediately following introduction of runoff or drift will be higher in some areas of the pond than those modeled on the basis of instantaneous distribution of the chemical throughout the pond. However, the countering assumption of no averaging time for acute risks may lead to overestimation of exposures throughout the water body, as described previously. The Agency is actively pursuing modeling techniques to possibly allow for greater or lesser dilution of surface runoff by receiving waters. These approaches, which are scheduled for SAP review in February 2004, may enhance the future understanding of water body residue levels near shore and near surface.

(6). Watershed to Pond Ratio

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One parameter affecting estimates of aqueous concentrations within the PRZM/EXAMS model concerns the relationship of watershed area to pond volume. The assumption of a 10hectare field running off to a 1-hectare pond of 2-meters depth is based on the USDA Natural Resource Conservation Service design criteria for farm pond construction.. Actual watershed to pond volume relationships, though, are driven by site characteristics (soil types, slopes, and meteorology). It is possible that larger treated watershed areas will result in more mass of pesticide running off to the pond. However, this screening-level runoff may become insignificant when the watershed area becomes so large that it precludes a reasonable assumption of a closed pond with no outlets. The Agency believes, based on professional judgment, that the currently used screening watershed area to pond volume overestimates likely aqueous concentrations. As a result, it is evaluating other models that will consider variations in water body volume and expects to present them to the SAP in 2004.

(7). 100 Percent Pesticide Treatment of the Pond Watershed

The Agency assumes that 100 percent of the watershed is treated with the pesticide, which would result in a maximum possible exposure. This assumption may be realistic for small water bodies with associated small watershed areas, but for large watersheds, it would result in an overestimation of exposure.

(8). Frequency of Exposure During a Given Year

A 1 in 10 Year Return Frequency Screening assessments rely on events (either instantaneous or over an averaging period) that have a return frequency of 1 in 10 years. This is calculated using the peak value of each of the 36 years modeled. The 1 in 10 return frequency does not necessarily represent a 90th percentile of all peaks over the years modeled. Existing surface water modeling outputs provide daily estimates of pesticide concentrations, which can be used to more completely characterize exposure, when required. The Agency has reviewed a number of these model time series for both persistent and non-persistent compounds used as multiple applications per year and has determined that the 1 in 10 year return frequency peak commonly represents a value farther out on the upper bound of the distribution of daily concentrations than the 90th percentile, with some cases being greater than the 99.9 percentile.

(9). Dilution of Sediment

The EXAMS model estimates of water concentration are based on an equilibrium established between the compartments of the pond, principally water and sediments. In real world situations, sediments are constantly being added to water bodies from the erosion of the watershed. Over time, this has the effect of increasing the mass of the sediments compartment, though the actual exchange area with overlying water may remain relatively constant. In EXAMS, the mass of the sediment compartment remains constant and serves as the denominator for estimating sediment concentrations, and through equilibrium assumptions, influences estimates of surface water concentrations. In cases where chemicals have appreciable stability in the environment, the

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EXAMS pond model will tend to overestimate the concentration in pond sediments because it does not allow for renewed sediment mass following runoff events. This may lead to higher predicted concentrations in both sediments and surface water because equilibrium is assumed between the two compartments.

Generic Assumptions and Limitations Related to Exposure for Terrestrial Animals

(1). Location of Wildlife Species

For screening terrestrial risk assessments for listed species, a generic bird or mammal is assumed to occupy either the treated field, or adjacent areas receiving pesticide at a rate commensurate with the treatment rate on the field. Spray drift model predictions suggest that this assumption leads to an overestimation of exposure to species that do not occupy the treated field. AgDrift estimated drift to areas removed from the treated fields (below) indicates that off site drift is but a fraction of on-field treatment rate. Spray Droplet Size AgDrift Model Drift Point Estimates 0 to 990 ft from Field Assumption (Tier 1) Very fine-fine 50% to 4% Fine to medium 50% to 1% Medium to coarse 50% to 0.5% Coarse to very coarse 50% to 0.3%

For screening risk assessment purposes, the actual habitat requirements of any particular terrestrial species are not considered, and it is assumed that species occupy, exclusively and permanently, the treatment area being modeled. This assumption leads to a maximum level of exposure in the risk characterization. To the extent that a species does not reside exclusively and permanently in treated areas, exposure will be less, and presumably significantly less.

(2). Routes of Exposure

Screening-level assessments for spray applications of pesticides consider dietary exposure alone. Other routes of exposure, not considered in the assessment, are discussed below.

-- Incidental Soil Ingestion

Exposure The screening-level risk assessment does not consider incidental soil ingestion. Available data suggests that up to 15% of the diet can consist of incidentally ingested soil depending upon species and feeding strategy (Beyer et al. 1994). A simple first approximation of soil concentration of pesticide from spray application shows the effect of not considering incidental soil ingestion: Assuming an application of 1 pound /acre (1.12 kg/ha) of pesticide to a bare, very low density soil (1 g/cm3) incorporated to only 1-cm depth (actual incorporation depths may range from 5 to 20 cm), the following soil concentrations can be calculated for a depth of 1 cm: soil concentration =
(((1.12 kg/ha)(1,000,000 mg/kg))/(100,000,000 cm3/ha)))(1 cm3/0.001 kg) = 11.2 mg/kg

Including this concentration into the standard screening-level method and assumptions for food item pesticide residues (e.g., 240 ppm residue assumption for short grass) shows that ingestion of soil at an incidental rate of up to 15% of the diet would not increase dietary exposure. In fact, for

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the majority of food items, inclusion of soil into the diet would effectively reduce the overall dietary concentration as compared to the present assumption of the entire diet consisting of the food source contaminated as per Fletcher et al. (1994) recommendations.

-- Inhalation Exposure

The screening risk assessment does not consider inhalation exposure. Such exposure may occur through three potential sources: (1) spray material in droplet form at time of application, (2) vapor phase pesticide volatilizing from treated surfaces, and (3) airborne particulate (soil, vegetative material, and pesticide dusts). Available data suggest that inhalation exposure at the time of application is not an appreciable route of exposure for birds. According to research on mallards and bobwhite quail, respirable particle size in birds (particles reaching the lung) is limited to a maximum diameter of 2 to 5 microns (U.S. Environmental Protection Agency, 1990). The spray droplet spectra covering the majority of pesticide application situations (AgDrift model scenarios for very-fine to coarse droplet applications) suggests that less than 1% of the applied material is within the respirable particle size. Theoretically, inhalation of pesticide active ingredient in the vapor phase may be another source of exposure for some pesticides under some exposure situations. Under laboratory conditions established to mimic pesticide application to a field, Driver et al. (1991) demonstrated that organophosphate exposure via inhalation produced significant short-term acetylcholinesterase inhibition in exposed birds. The flux of pesticide from treated plant and soil surfaces can be appreciable for soil fumigants. However, the assessment of pesticide flux from treated surfaces and its subsequent distribution within the overlying atmosphere is complex and highly situation-specific, negating any confident generic assumptions regarding significance. Recognizing these limitations the Agency is evaluating options for modeling vapor phase exposures, including approaches for establishing near-field, near-ground air concentrations based upon equilibrium and kinetics-based air models. The Agency is also working on methods to account for potential differences in toxic potency of pesticide active ingredients when available toxicity data are limited. It is anticipated that these modeling approaches and toxicity extrapolation methods will be presented to the Agency's SAP in 2004 for avian risk assessment, and subsequent approaches for other taxa will be developed and incorporated into the risk assessment process based on the results of the avian peer review. The impact from exposure to dusts contaminated with the pesticide cannot be assessed generically as partitioning issues related to application site soils and chemical properties render the exposure potential from this route highly situation specific.

-- Dermal Exposure

The screening assessment does not consider dermal exposure, except as it is indirectly included in calculations of RQS based on lethal doses per unit of pesticide treated area. Dermal exposure may occur through three potential sources: (1) direct application of spray to terrestrial wildlife in the treated area or within the drift footprint, (2) incidental contact with contaminated vegetation, or (3) contact with contaminated water or soil. Recent Agency refined risk assessment efforts for select mosquito adulticides and investigations into tools for quantifying dermal exposure suggest that interception of spray and incidental contact with treated substrates may pose risks to avian

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wildlife. In addition, research conducted by Driver et al. (1991) on northern bobwhite quail exposed to treated vegetation suggests that, for the organophosphate methyl parathion, dermal exposure may be a major contributor to avian dose under simulated field conditions. The available measured data related to wildlife dermal contact with pesticides are extremely limited. The Agency is actively pursuing modeling techniques to account for dermal exposure via direct application of spray and by incidental contact with vegetation. Presentation of these modeling approaches and toxicity extrapolation methods to the SAP is expected to occur in 2004 for avian risk assessment, and subsequent approaches for other taxa will be developed and incorporated into the risk assessment process based on the results of the avian peer review.

-- Drinking Water Exposure

Drinking water exposure to a pesticide active ingredient may be the result of consumption of surface water or consumption of the pesticide in dew or other water on the surfaces of treated vegetation. For pesticide active ingredients with a potential to dissolve in runoff, puddles on the treated field may contain the chemical. Similarly, pesticides with lower organic carbon partitioning characteristics and higher solubility in water have a greater potential to dissolve in dew and other water associated with plant surfaces. Estimating the extent to which such pesticide loadings to drinking water occurs is complex and would depend upon the partitioning characteristics of the active ingredient, the types of soils of the treatment area, and the meteorology of the treatment area. In addition, the use of various water sources by wildlife is highly species-specific. As a result, the Agency is actively developing processes to quantify drinking water exposures from field puddles and dew. An initial screening approach for modeling drinking water exposure has been presented to the Agency's SAP and modifications to these modeling approaches are expected to undergo SAP review in 2004.

(3). Incidental Pesticide Releases Associated with Use

Agency risk assessments are based on the assumption that the entire treatment area is subject to pesticide application at the rates specified on the label. In reality, there is the potential for uneven application of the pesticide through such plausible incidents as changes in calibration of application equipment, spillage, and localized releases at specific areas of the treated field that are associated with specifics of the type of application equipment used (e.g., increased application at turnabouts when using older ground application equipment). The Agency does not quantitatively account for such incidental releases of pesticides associated with labeled uses of the products, but it does indicate where such situations have resulted in wildlife mortality incidents and discusses this source of uncertainty in the risk characterizations.

(4). Residue Levels Selection

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As discussed earlier in the exposure section of this document, the Agency relies on the work of Fletcher et al. (1994) for setting the assumed pesticide residues in wildlife dietary items. The Agency believes that these residue assumptions reflect a realistic upper-bound residue estimate, although the degree to which this assumption reflects a specific percentile estimate is difficult to quantify. Fletcher et al.(1994) maintains that the pesticide active ingredient residue assumptions employed by the Agency represent a 95th percentile estimate. In contrast to the Fletcher evaluation, field measurement efforts by Pfleeger et al. (1996) indicated that the Agency assumption of residues for short grass, broadleaf forage, and fruits were not exceeded. Agency predictions of residues were exceeded by 16% of long grass measurements, and 21% of seed/pod measurements. Finally, Baehr and Habig (2000) compared Agency residue assumptions with distributions of measured pesticide residues from the Agency's UTAB database. This comparison suggested that Agency residue assumptions (1) exceed the 99th percentile of the UTAB distribution for short grass and long grass, fall just below the 95th percentile for forage, and (2) fall between the 95th and 98th percentiles for fruits and seeds. It is important to note that the field measurement efforts used to develop the Fletcher estimates of exposure involve highly varied sampling techniques. It is entirely possible that much of these data reflect residues averaged over entire above ground plants in the case of grass and forage sampling. Depending upon a specific wildlife species' foraging habits, whole above-ground plant samples may either underestimate or overestimate actual exposure. For example, wildlife, feeding on the tops of forage plants after application, may be exposed to higher concentrations of pesticide in plant tops than predicted by sampling efforts focusing on whole above-ground plant measurements

(5). Dietary Intake - The Differences Between Laboratory and Field Conditions

Acute and chronic risk assessments rely on comparisons of wildlife dietary residues withLC50 or NOEC values expressed in concentrations of pesticides in laboratory feed. These comparisons assume that ingestion of food items in the field occurs at rates commensurate with those in the laboratory. Although the screening assessment process adjusts dry-weight estimates of food intake to reflect the increased mass in fresh-weight wildlife food intake estimates, it does not allow for gross energy and assimilative efficiency differences between wildlife food items and laboratory feed. The significance of the gross energy content between laboratory feed and "field" diet can be seen in the following example:

-- A typical laboratory avian feed, as used, contains approximately 2750 kcal/ kg.
-- The Agency's Wildlife Exposure Factors Handbook (U.S. Environmental Protection Agency, 1993) presents the following dry-weight and fresh weight caloric contents for selected wildlife food items:

Food Item	Energy Dry (kcal/kg)	Energy Fresh (kcal/kg)
grasses	4200	1300
broadleaf forage	4200	2200
seeds	5100	4700
fruits	2000	1100
insects	5600	1600

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On gross energy content alone, direct comparison of a laboratory dietary concentration-based effects threshold to a fresh-weight pesticide residue estimate would result in an underestimation of field exposure by food consumption by a factor of 1.25 - 2.5 for most food items. Only for seeds would the direct comparison of dietary threshold to residue estimate lead to an overestimate of exposure. Differences in assimilative efficiency between laboratory and wild diets suggest that current screening assessment methods are not accounting for a potentially important aspect of food requirements. Depending upon species and dietary matrix, bird assimilation of wild diet energy ranges from 23 - 80%, and mammal's assimilation ranges from 41 - 85% (U.S. Environmental Protection Agency, 1993). If it is assumed that laboratory chow is formulated to maximize assimilative efficiency (e.g., a value of 85%), a potential for underestimation of exposure may exist by assuming that consumption of food in the wild is comparable with consumption during laboratory testing. In the screening process, exposure may be underestimated because metabolic rates are not related to food consumption. For example, the Wildlife Exposure Factors Handbook (U.S. Environmental Protection Agency, 1993) includes allometric models for estimating both existing metabolic rate (EMR) and free living metabolic rate (FMR). EMR is the metabolic rate necessary for animal maintenance in captivity without body weight loss, a condition similar to caged test animals. FMR is the energy requirement for an organism in the wild. For passerine birds these relationships are as follows:

$$\text{EMR (kcal/day)} = 1.572\ (\text{body weight g})^{0.6210}$$
$$\text{FMR (kcal/day)} = 2.123\ (\text{body weight g})^{0.749}$$

Using a weight range for passerines of 10 - 150 g, the EMR predictions range from 6.6 to 35.3, and the FMR ranges from 11.9 to 90.5 kcal/day . Thus, it appears that not accounting for increased energy demands of organisms in the wild when comparing dietary residues to dietary toxicity thresholds represents about a two-fold underestimation in exposure potential. Finally, the screening procedure does not account for situations where the feeding rate may be above or below requirements to meet free living metabolic requirements. Gorging behavior is a possibility under some specific wildlife scenarios (e.g., bird migration) where the food intake rate may be greatly increased. Kirkwood (1983) has suggested that an upper-bound limit to this behavior might be the typical intake rate multiplied by a factor of 5. In contrast is the potential for avoidance, operationally defined as animals responding to the presence of noxious chemicals in their food by reducing consumption of treated dietary elements. This response is seen in nature where herbivores avoid plant secondary compounds.

For agrochemicals, Dolbeer et al. (1994) reported that the use of methiocarb on fruit crops reduced depredation by birds. Of course, chemical treatment of food sources and any subsequent avoidance of those food sources by a species may, in itself, result in detrimental effects on the energetics of the species.

Generic Assumptions and Limitations Related to Effects Assessment

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(1). Sublethal Effects

For an acute risk assessment, the screening risk assessment relies on the acute mortality endpoint as well as a suite of sublethal responses to the pesticide, as determined by the testing of species response to chronic exposure conditions and subsequent chronic risk assessment. Of course, a risk assessment team has the option of considering additional sublethal data in the assessment. This option is exercised on a case-by-case basis and only after careful consideration of the nature of the sublethal effect measured and the extent and quality of available data to support establishing a plausible relationship between the measure of effect (sublethal endpoint) and the assessment endpoints. This option includes a determination of whether there are clear, reasonable, and plausible links between the sublethal effect and survival or reproductive capacity of organisms in the field in accordance with the screening assessment endpoints of survival and reproduction capacity. The Agency documents the findings of such evaluations of additional sublethal effects in the effects assessment and includes a discussion of their potential effects upon the confidence of the overall risk assessment conclusions. The Agency anticipates that, through the SAP and related external peer-review processes in the scientific community, accepted risk assessment practices will continue to advance in this area. As with other risk assessment techniques, when new approaches are vetted through the peer-review process, the Agency will continue its practice of including state-of-the-science methodologies and anticipates collaborative efforts with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service in developing future sublethal endpoint analysis approaches for peer review.

(2). Age Class and Sensitivity of Effects

Thresholds It is generally recognized that test organism age may have a significant impact on the observed sensitivity to a toxicant. The screening risk assessment acute toxicity data for fish are collected on juvenile fish between 0.1 and 5 grams. Aquatic invertebrate acute testing is performed on recommended immature age classes (e.g., first instar for daphnids, second instar for amphipods, stoneflies and mayflies, and third instar for midges). Similarly, acute dietary testing with birds is also performed on juveniles, with mallards being 5 -10 days old and quail 10 -14 days old. Testing of juveniles may overestimate toxicity at older age classes for pesticidal active ingredients that act directly (without metabolic transformation) because younger age classes may not have the enzymatic systems associated with detoxifying xenobiotics. However, the influence of age may not be uniform for all compounds, and compounds requiring metabolic activation may be more toxic in older age classes. The screening risk assessment has no current provisions for a generally applied method that accounts for this uncertainty. In so far as the available toxicity data may provide ranges of sensitivity information with respect to age class, the risk assessment uses the most sensitive life-stage information as the conservative screening endpoint and includes an evaluation of all available age-class sensitivity information as it impacts the confidence of risk conclusions in the risk characterization section of the document.

(3). Use of the Most Sensitive Species Tested

Although the screening risk assessment relies on a selected toxicity endpoint from the most sensitive species tested, it does not necessarily mean that the selected toxicity endpoints reflect

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sensitivity of the most sensitive species existing in a given environment. The relative position of the most sensitive species tested in the distribution of all possible species is a function of the overall variability among species to a particular chemical. In the case of listed species, there is uncertainty regarding the relationship of the listed species' sensitivity and the most sensitive species tested. Knowledge about the inherent interspecies variability is limited to information available from a small sampling of the overall universe of species (i.e., a relatively small number of species actually tested) and estimates statistically derived using classical sampling theory. Confidence in the use of the most sensitive species tested as a protective estimate of listed species sensitivity is a function of the size of the tested species pool, the representation of species tested across taxonomic groups of interest, and the variability across measured toxicity endpoints for the tested species. It is likely that any given species can be arrayed throughout the distribution of sensitivities of given taxonomic groups to pesticides. In the case of species-specific assessments, there may be sufficient information on specific taxonomic groups to allow for more certain interspecies extrapolations for closely defined toxicological endpoints. The Agency is presently evaluating extrapolation methods to relate listed species or close taxonomic groups to tested species or taxonomic groups. Without prior knowledge about relative position of individual tested species and a given species of concern (e.g., listed species) within the distribution of sensitivities for a given chemical, an evaluation of the ability of tested species to represent the most sensitive species (a lower limit to potential sensitivity to a toxicant) provides insight into the confidence of risk predictions to protect all species within a taxonomic group. This is achieved by a simple calculation: probability of representing most sensitive species = number of tested species/total number of species Given the small numbers of species tested and the comparatively large number of species for which these data are to represent, it is not likely that tested species represent the most sensitive species within the broad taxonomic groups used in the screening risk assessment. For example, if two bird species are randomly tested and there are 650 species of birds in the United States, the probability of capturing an endpoint representing the most sensitive species is 2/650 or roughly 0.3 percent. Another method to evaluate assumptions concerning interspecies sensitivity is to estimate the probability of a measured value representing an nth percentile sensitive species (i.e., some reasonable or acceptable lower bound of potential sensitivity). Thus, the sampling of two random bird species would have a probability of encompassing the 5th percentile species as follows:

probability of representing the 5th percentile or lower =1-(1-p)n =(1-(1-0.05)2 = 0.0975
Where: p is the target nth percentile (0.05 for this case) and n equals the number of trials (2 for a random testing of two bird species)

It should be noted that such evaluations cannot provide information on the likely value of the toxicity endpoint when extrapolated from a tested species to the most sensitive or the nth percentile species. To do that, it is necessary to have information on the variability of the response among species. This can be accomplished by looking at the variance among tested species, provided it is accepted that the tested species are randomly sampled from the overall population. With only two species sampled within a taxonomic group, estimating the variability for the species sensitivity across that group is by nature uncertain. Indeed, sampling statistics would suggest that the confidence of predicting rare events from small sample sizes is not improved until the sample size approaches 30. Departing from the usual sampling statistics for testing a single compound, toxicologists have turned to more robust data sets by looking at the

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available toxicity endpoints from a variety of tested compounds and predicting the level of sensitivity of species on the lower bounds of the distribution (often the convention is at the 5th or 10th percentile). For example, Luttik and Aldenberg (1997) evaluated 55 compounds with LD50 data on birds and 69 compounds with LD50 data for mammals. In each case, data were available for four or more species. Evaluation of the distribution characteristics of these data suggested that for small sample sizes of available LD50 data (N<4, a likely situation for many pesticide registrations), factors of 0.175 and 0.263 applied to the geometric mean of available data would approximate a 5th percentile species sensitivity with 50% confidence. If greater confidence was desired in the prediction of the 5th percentile species sensitivity from small data sets, the extrapolation factors would be even smaller. For example, Luttik and Aldenberg (1997) recommended extrapolation factors of 0.051 and 0.1, for situations where only two bird or mammal species are tested and the 5th percentile and 95% confidence is required. The Agency is presently evaluating such extrapolation methods for aquatic species.

As discussed earlier in this document, the Agency is not limited to a base set of surrogate toxicity information in establishing risk assessment conclusions. The Agency also considers toxicity data on non-standard test species (e.g., amphibian data) when available. To the extent that such data meet data quality requirements, it is used to interpret the relevance of risk assessment LOCs in the context of other tested taxa.

Generic Assumptions Associated with the Acute LOCs

Urban and Cook (Support Document #8) presented a mathematical analysis of the use of the 0.1 and 0.05 factor applied to the most sensitive LC50 or LD50 as the effects threshold for the acute toxicity LOC for an endangered species. As summarized by Urban and Cook, 0.1 (LC50) is equivalent to an individual risk of mortality of 1 in 30 million for a pesticide active ingredient with a probit slope of 4.5. Re-analysis suggests that this is in error. The calculation of dose (LCk) associated with a defined response for a probit slope curve is as follows: logLCk = logLC50 + (probit k-probit5)/b where: LC50 equals probit 5 and b equals slope This can also be expressed as: LCk = (LC50)(10z/b)logLCk = logLC50+(z/b) where: z is the standard normal deviate and b equals the slope Using a 10-fold difference between the LC50 of 100 and the LCk (i.e., an LOC threshold of0.1(LC50)) and a typical slope of 4.5, the solution for z would be -4.5. This standard normal deviate corresponds to a probability of mortality of approximately 1/300,000. Using a plausible range of slopes of 2 to 9 (e.g., the range of slopes with the insecticide carbofuran) the probabilities of individual mortality ranges from 1/50 to less than 10-16 at a LOC threshold of 0.1(LC50). The risk characterization section of the assessment document includes an evaluation of the potential for individual effects at an exposure level equivalent to the LOC. This evaluation is based on the median lethal dose estimate and dose/response relationship established for the effects study corresponding to each taxonomic group for which the LOCs are exceeded.

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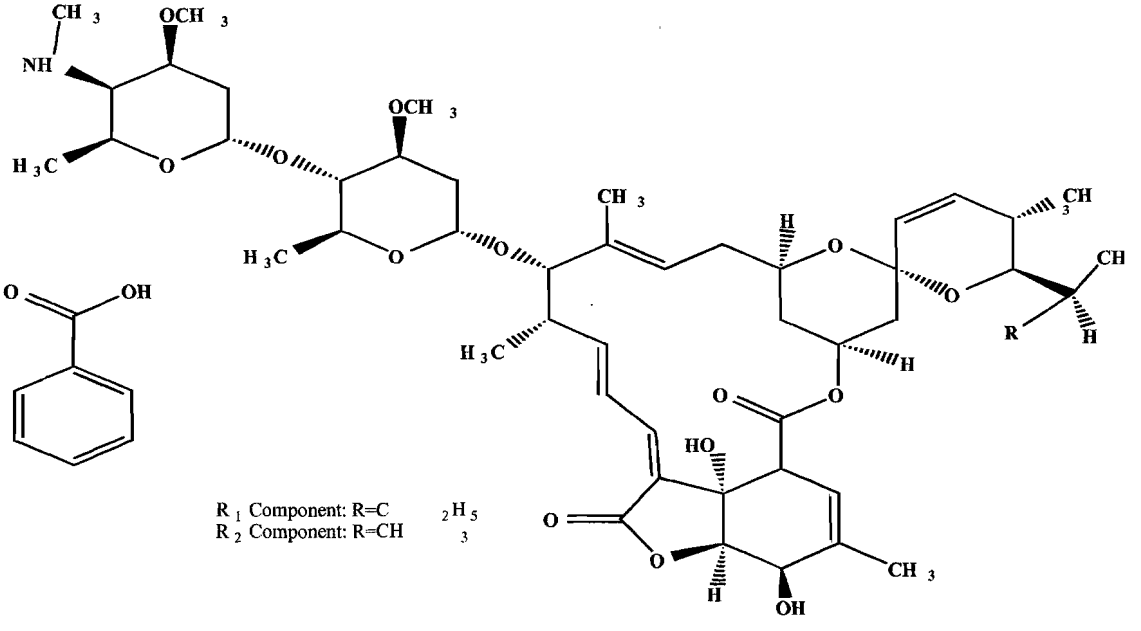
Appendix A. Structure of Degradates of Concern



Degradate 2: 8,9-Z MA ((8,9-Z)-4"-epimethylamino-4"-deoxy anermectin B1)

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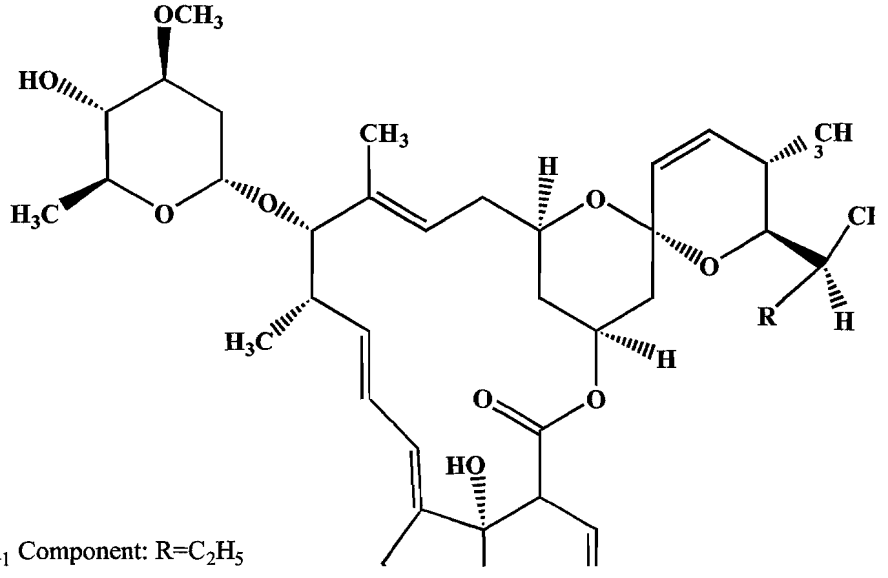
MAB1a (avermectin B1 monosaccharide)



R_1 Component: $R=C_2H_5$

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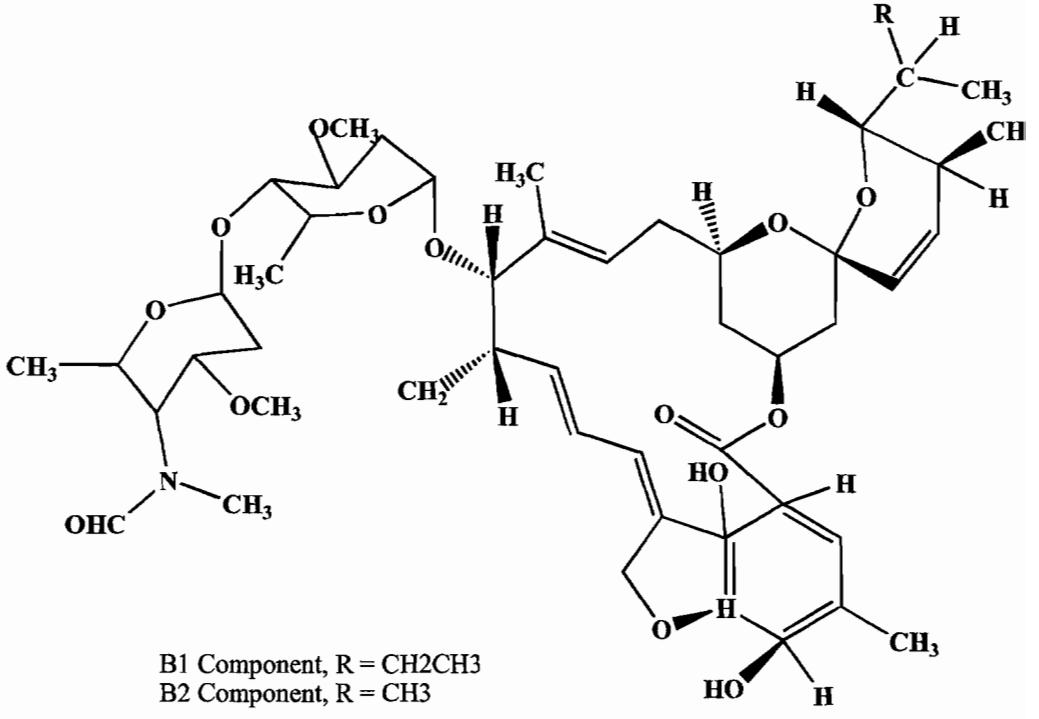

FAB (4"-epi-(N-formyl)-4"-deoxyavermectin B1)

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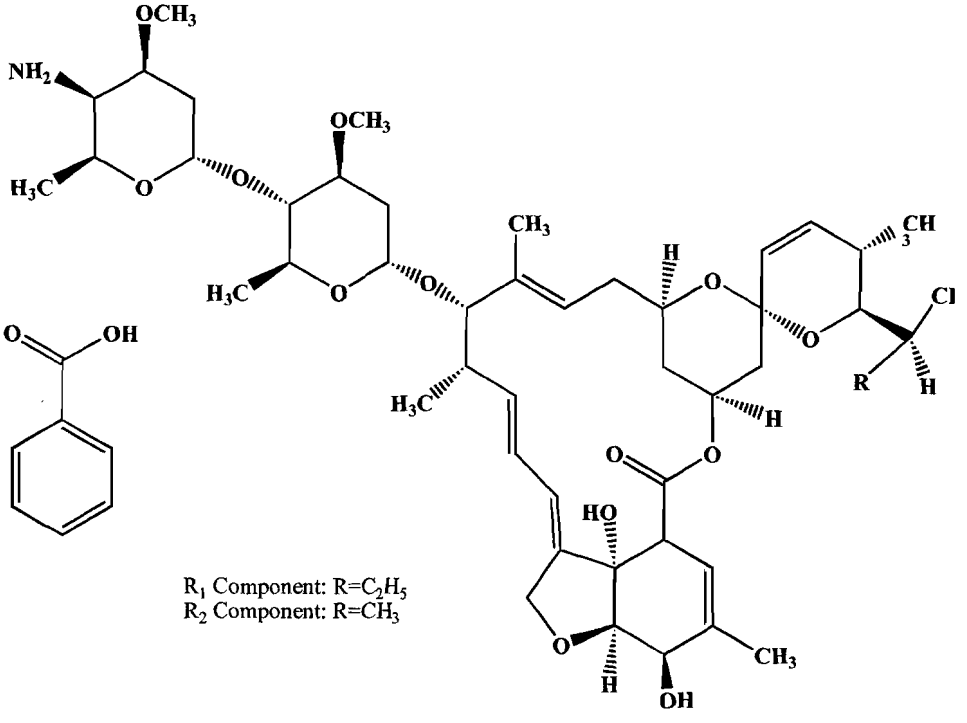
AB1a (4"-epiamino-4"-deoxyavermectin B1)



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Appendix B. Aquatic Exposure Modeling and Results (PRZM/EXAMs)

stored as ORfilbert low.out
Chemical: emamectin benzoate
PRZM environment:
ORfilbertsSTD.txt modified Tueday, 29 May 2007 at 13:00:18
EXAMS environment:
pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w24232.dvf modified Wedday, 3 July 2002 at 09:06:10
Water segment concentrations (ppb)

Year		Peak	96 hr	21 Day	60 Day	90 Day		Yearly
	1961	0.006428	0.002058	0.000864	0.000489		0.000414	0.000259
	1962	0.01539	0.005017	0.002327	0.001771		0.001639	0.001148
	1963	0.0575	0.02337	0.008541	0.006193		0.005755	0.004424
	1964	0.03176	0.01758	0.008987	0.007106		0.00664	0.006148
	1965	0.02268	0.01367	0.009376	0.00845		0.008442	0.008078
	1966	0.02841	0.0141	0.01048	0.01005		0.009863	0.00945
	1967	0.0354	0.01673	0.01153	0.01069		0.01073	0.01031
	1968	0.03309	0.02003	0.01438	0.01334		0.0132	0.01231
	1969	0.02718	0.01809	0.01541	0.01457		0.01432	0.01401
	1970	0.04419	0.02294	0.01727	0.01662		0.01643	0.01584
	1971	0.04379	0.02508	0.01903	0.01782		0.01764	0.01721
	1972	0.05359	0.0273	0.0204	0.01937		0.01934	0.01867
	1973	0.03188	0.02219	0.02037	0.01949		0.01891	0.01857
	1974	0.0493	0.03041	0.02311	0.0216		0.02155	0.02067
	1975	0.03181	0.02332	0.02143	0.02107		0.02102	0.02051
	1976	0.04051	0.02739	0.02234	0.02184		0.02159	0.02072
	1977	0.03206	0.02405	0.02118	0.02024		0.02002	0.01972
	1978	0.03756	0.02759	0.02216	0.02118		0.021	0.02046
	1979	0.03421	0.02362	0.02119	0.02083		0.02085	0.02047
	1980	0.04256	0.03004	0.02313	0.02198		0.0214	0.02114
	1981	0.0363	0.0262	0.02362	0.02293		0.02268	0.02208
	1982	0.03706	0.02674	0.02426	0.02386		0.02373	0.02306
	1983	0.0431	0.02951	0.02559	0.02508		0.02488	0.02397
	1984	0.03576	0.02686	0.02497	0.0245		0.02446	0.02396
	1985	0.03502	0.02711	0.02459	0.02412		0.02415	0.02361
	1986	0.0463	0.02996	0.02514	0.0244		0.02418	0.02328
	1987	0.04133	0.0307	0.02557	0.02377		0.02383	0.02332
	1988	0.03746	0.02748	0.02501	0.02427		0.0242	0.02353
	1989	0.04999	0.02954	0.02408	0.02361		0.02345	0.0229
	1990	0.03504	0.02665	0.02456	0.024		0.02393	0.0232

Sorted results

Prob.		Peak	96 hr	21 Day	60 Day	90 Day		Yearly
	0.032258	0.0575	0.0307	0.02559	0.02508		0.02488	0.02397
	0.064516	0.05359	0.03041	0.02557	0.0245		0.02446	0.02396
	0.096774	0.04999	0.03004	0.02514	0.0244		0.0242	0.02361
	0.129032	0.0493	0.02996	0.02501	0.02427		0.02418	0.02353

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0.16129	0.0463	0.02954	0.02497	0.02412	0.02415	0.02332
0.193548	0.04419	0.02951	0.02459	0.024	0.02393	0.02328
0.225806	0.04379	0.02759	0.02456	0.02386	0.02383	0.0232
0.258065	0.0431	0.02748	0.02426	0.02377	0.02373	0.02306
0.290323	0.04256	0.02739	0.02408	0.02361	0.02345	0.0229
0.322581	0.04133	0.0273	0.02362	0.02293	0.02268	0.02208
0.354839	0.04051	0.02711	0.02313	0.02198	0.02159	0.02114
0.387097	0.03756	0.02686	0.02311	0.02184	0.02155	0.02072
0.419355	0.03746	0.02674	0.02234	0.0216	0.0214	0.02067
0.451613	0.03706	0.02665	0.02216	0.02118	0.02102	0.02051
0.483871	0.0363	0.0262	0.02143	0.02107	0.021	0.02047
0.516129	0.03576	0.02508	0.02119	0.02083	0.02085	0.02046
0.548387	0.0354	0.02405	0.02118	0.02024	0.02002	0.01972
0.580645	0.03504	0.02362	0.0204	0.01949	0.01934	0.01867
0.612903	0.03502	0.02337	0.02037	0.01937	0.01891	0.01857
0.645161	0.03421	0.02332	0.01903	0.01782	0.01764	0.01721
0.677419	0.03309	0.02294	0.01727	0.01662	0.01643	0.01584
0.709677	0.03206	0.02219	0.01541	0.01457	0.01432	0.01401
0.741935	0.03188	0.02003	0.01438	0.01334	0.0132	0.01231
0.774194	0.03181	0.01809	0.01153	0.01069	0.01073	0.01031
0.806452	0.03176	0.01758	0.01048	0.01005	0.009863	0.00945
0.83871	0.02841	0.01673	0.009376	0.00845	0.008442	0.008078
0.870968	0.02718	0.0141	0.008987	0.007106	0.00664	0.006148
0.903226	0.02268	0.01367	0.008541	0.006193	0.005755	0.004424
0.935484	0.01539	0.005017	0.002327	0.001771	0.001639	0.001148
0.967742	0.006428	0.002058	0.000864	0.000489	0.000414	0.000259
0.1	0.049921	0.030032	0.025127	0.024387	0.024198	0.023602
					Average of yearly averages:	0.017101

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: ORfilbert low

Metfile:	w24232.dvf			
PRZM scenario:	ORfilbertsSTD.txt			
EXAMS environment file:	pond298.exv			
Chemical Name:	emamectin benzoate			
Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	964.23	g/mol	
Henry's Law Const.	henry	3.80E-10	atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	930	mg/L	
Kd	Kd		mg/L	
Koc	Koc	265687	mg/L	
Photolysis half-life	kdp	23	days	Half-life
Aerobic Aquatic Metabolism	kbacw	1158	days	Halfife
Anaerobic Aquatic	kbacs	1281	days	Halfife

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Metabolism				
Aerobic Soil Metabolism	asm	579	days	Halfife
Hydrolysis:	pH 5	0	days	Half-life
Hydrolysis:	pH 7	0	days	Half-life
Hydrolysis:	pH 9	0	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI	0	cm	
Application Rate:	TAPP	0.0168	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	4-Jan	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.0168	kg/ha	
Interval 2	interval	7	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.0168	kg/ha	
Record 17:	FILTRA			
	IPSCND	1		
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT			
	FEXTRC	0.5		
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

stored as ORfilbert low.out
Chemical: emamectin benzoate
PRZM environment:
ORfilbertsSTD.txt modified Tueday, 29 May 2007 at 13:00:18
EXAMS environment:
pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w24232.dvf modified Wedday, 3 July 2002 at 09:06:10
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.006428	0.002058	0.000864	0.000489	0.000414	0.000259
1962	0.01539	0.005017	0.002327	0.001771	0.001639	0.001148
1963	0.0575	0.02337	0.008541	0.006193	0.005755	0.004424
1964	0.03176	0.01758	0.008987	0.007106	0.00664	0.006148
1965	0.02268	0.01367	0.009376	0.00845	0.008442	0.008078
1966	0.02841	0.0141	0.01048	0.01005	0.009863	0.00945
1967	0.0354	0.01673	0.01153	0.01069	0.01073	0.01031
1968	0.03309	0.02003	0.01438	0.01334	0.0132	0.01231
1969	0.02718	0.01809	0.01541	0.01457	0.01432	0.01401
1970	0.04419	0.02294	0.01727	0.01662	0.01643	0.01584
1971	0.04379	0.02508	0.01903	0.01782	0.01764	0.01721
1972	0.05359	0.0273	0.0204	0.01937	0.01934	0.01867
1973	0.03188	0.02219	0.02037	0.01949	0.01891	0.01857
1974	0.0493	0.03041	0.02311	0.0216	0.02155	0.02067
1975	0.03181	0.02332	0.02143	0.02107	0.02102	0.02051
1976	0.04051	0.02739	0.02234	0.02184	0.02159	0.02072
1977	0.03206	0.02405	0.02118	0.02024	0.02002	0.01972
1978	0.03756	0.02759	0.02216	0.02118	0.021	0.02046

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1979	0.03421	0.02362	0.02119	0.02083	0.02085	0.02047
1980	0.04256	0.03004	0.02313	0.02198	0.0214	0.02114
1981	0.0363	0.0262	0.02362	0.02293	0.02268	0.02208
1982	0.03706	0.02674	0.02426	0.02386	0.02373	0.02306
1983	0.0431	0.02951	0.02559	0.02508	0.02488	0.02397
1984	0.03576	0.02686	0.02497	0.0245	0.02446	0.02396
1985	0.03502	0.02711	0.02459	0.02412	0.02415	0.02361
1986	0.0463	0.02996	0.02514	0.0244	0.02418	0.02328
1987	0.04133	0.0307	0.02557	0.02377	0.02383	0.02332
1988	0.03746	0.02748	0.02501	0.02427	0.0242	0.02353
1989	0.04999	0.02954	0.02408	0.02361	0.02345	0.0229
1990	0.03504	0.02665	0.02456	0.024	0.02393	0.0232

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258	0.0575	0.0307	0.02559	0.02508	0.02488	0.02397
0.064516	0.05359	0.03041	0.02557	0.0245	0.02446	0.02396
0.096774	0.04999	0.03004	0.02514	0.0244	0.0242	0.02361
0.129032	0.0493	0.02996	0.02501	0.02427	0.02418	0.02353
0.16129	0.0463	0.02954	0.02497	0.02412	0.02415	0.02332
0.193548	0.04419	0.02951	0.02459	0.024	0.02393	0.02328
0.225806	0.04379	0.02759	0.02456	0.02386	0.02383	0.0232
0.258065	0.0431	0.02748	0.02426	0.02377	0.02373	0.02306
0.290323	0.04256	0.02739	0.02408	0.02361	0.02345	0.0229
0.322581	0.04133	0.0273	0.02362	0.02293	0.02268	0.02208
0.354839	0.04051	0.02711	0.02313	0.02198	0.02159	0.02114
0.387097	0.03756	0.02686	0.02311	0.02184	0.02155	0.02072
0.419355	0.03746	0.02674	0.02234	0.0216	0.0214	0.02067
0.451613	0.03706	0.02665	0.02216	0.02118	0.02102	0.02051
0.483871	0.0363	0.0262	0.02143	0.02107	0.021	0.02047
0.516129	0.03576	0.02508	0.02119	0.02083	0.02085	0.02046
0.548387	0.0354	0.02405	0.02118	0.02024	0.02002	0.01972
0.580645	0.03504	0.02362	0.0204	0.01949	0.01934	0.01867
0.612903	0.03502	0.02337	0.02037	0.01937	0.01891	0.01857
0.645161	0.03421	0.02332	0.01903	0.01782	0.01764	0.01721
0.677419	0.03309	0.02294	0.01727	0.01662	0.01643	0.01584
0.709677	0.03206	0.02219	0.01541	0.01457	0.01432	0.01401
0.741935	0.03188	0.02003	0.01438	0.01334	0.0132	0.01231
0.774194	0.03181	0.01809	0.01153	0.01069	0.01073	0.01031
0.806452	0.03176	0.01758	0.01048	0.01005	0.009863	0.00945
0.83871	0.02841	0.01673	0.009376	0.00845	0.008442	0.008078
0.870968	0.02718	0.0141	0.008987	0.007106	0.00664	0.006148
0.903226	0.02268	0.01367	0.008541	0.006193	0.005755	0.004424
0.935484	0.01539	0.005017	0.002327	0.001771	0.001639	0.001148
0.967742	0.006428	0.002058	0.000864	0.000489	0.000414	0.000259
0.1	0.049921	0.030032	0.025127	0.024387	0.024198	0.023602
					Average of yearly averages:	0.017101

Inputs generated by pe5.pl - Novemeber 2006

US EPA ARCHIVE DOCUMENT

Data used for this run:
Output File: ORfilbert low

Metfile:	w24232.dvf			
PRZM scenario:	ORfilbertsSTD.txt			
EXAMS environment file:	pond298.exv			
Chemical Name:	emamectin benzoate			
Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	964.23	g/mol	
Henry's Law Const.	henry	3.80E-10	atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	930	mg/L	
Kd	Kd		mg/L	
Koc	Koc	265687	mg/L	
Photolysis half-life	kdp	23	days	Half-life
Aerobic Aquatic Metabolism	kbacw	1158	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1281	days	Halfife
Aerobic Soil Metabolism	asm	579	days	Halfife
Hydrolysis:	pH 5	0	days	Half-life
Hydrolysis:	pH 7	0	days	Half-life
Hydrolysis:	pH 9	0	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI	0	cm	
Application Rate:	TAPP	0.0168	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	4-Jan	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.0168	kg/ha	
Interval 2	interval	7	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.0168	kg/ha	
Record 17:	FILTRA			
	IPSCND	1		
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT			
	FEXTRC	0.5		
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

stored as GApecan low.out
Chemical: emamectin benzoate
PRZM environment:
GAPecansSTD.txt modified Tueday, 29 May 2007 at 12:55:08
EXAMS environment:
pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w93805.dvf modified Wedday, 3 July 2002 at 09:04:32

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Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.02717	0.01068	0.003309	0.00212	0.001986	0.000868
1962	0.04032	0.01336	0.007205	0.006205	0.005691	0.004082
1963	0.04651	0.01883	0.01267	0.01074	0.01052	0.008686
1964	0.1098	0.03966	0.02231	0.01982	0.01962	0.01604
1965	0.1379	0.05191	0.03076	0.02638	0.02555	0.02218
1966	0.1696	0.06243	0.03382	0.02938	0.02872	0.02605
1967	0.07417	0.03922	0.0299	0.02857	0.02771	0.02686
1968	0.1196	0.0505	0.03306	0.03127	0.03075	0.02807
1969	0.1169	0.05845	0.03809	0.03463	0.03413	0.03174
1970	0.1272	0.0577	0.0391	0.03627	0.03559	0.03399
1971	0.06684	0.04173	0.03667	0.03484	0.03442	0.03368
1972	0.2101	0.0806	0.04647	0.04051	0.03933	0.03623
1973	0.08723	0.05053	0.04222	0.03982	0.03946	0.03816
1974	0.08247	0.05107	0.04022	0.03859	0.03814	0.03739
1975	0.08698	0.05796	0.04359	0.04122	0.041	0.03966
1976	0.1005	0.05591	0.0453	0.04307	0.04265	0.04112
1977	0.06753	0.04769	0.04258	0.04215	0.04204	0.04091
1978	0.1066	0.05613	0.04176	0.04048	0.04023	0.03965
1979	0.09133	0.05412	0.04418	0.04254	0.04192	0.0412
1980	0.08037	0.05585	0.04404	0.04189	0.04193	0.0413
1981	0.07305	0.04866	0.04213	0.04148	0.04106	0.03946
1982	0.2345	0.08946	0.05099	0.04502	0.04376	0.04003
1983	0.07777	0.05108	0.04305	0.04164	0.04117	0.04029
1984	0.05292	0.04507	0.04192	0.0412	0.04099	0.03971
1985	0.1566	0.0685	0.04597	0.04457	0.04254	0.03961
1986	0.1174	0.06085	0.04616	0.04406	0.04371	0.04238
1987	0.1037	0.06489	0.04862	0.04529	0.04483	0.04311
1988	0.07781	0.0495	0.04411	0.04308	0.04289	0.04145
1989	0.1381	0.06692	0.05021	0.04599	0.04482	0.04175
1990	0.08904	0.05163	0.04264	0.04161	0.04147	0.04041

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258	0.2345	0.08946	0.05099	0.04599	0.04483	0.04311
0.064516	0.2101	0.0806	0.05021	0.04529	0.04482	0.04238
0.096774	0.1696	0.0685	0.04862	0.04502	0.04376	0.04175
0.129032	0.1566	0.06692	0.04647	0.04457	0.04371	0.04145
0.16129	0.1381	0.06489	0.04616	0.04406	0.04289	0.0413
0.193548	0.1379	0.06243	0.04597	0.04308	0.04265	0.0412
0.225806	0.1272	0.06085	0.0453	0.04307	0.04254	0.04112
0.258065	0.1196	0.05845	0.04418	0.04254	0.04204	0.04091
0.290323	0.1174	0.05796	0.04411	0.04215	0.04193	0.04041
0.322581	0.1169	0.0577	0.04404	0.04189	0.04192	0.04029
0.354839	0.1098	0.05613	0.04359	0.04164	0.04147	0.04003
0.387097	0.1066	0.05591	0.04305	0.04161	0.04117	0.03971
0.419355	0.1037	0.05585	0.04264	0.04148	0.04106	0.03966
0.451613	0.1005	0.05412	0.04258	0.04122	0.041	0.03965

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0.483871	0.09133	0.05191	0.04222	0.0412	0.04099	0.03961
0.516129	0.08904	0.05163	0.04213	0.04051	0.04023	0.03946
0.548387	0.08723	0.05108	0.04192	0.04048	0.03946	0.03816
0.580645	0.08698	0.05107	0.04176	0.03982	0.03933	0.03739
0.612903	0.08247	0.05053	0.04022	0.03859	0.03814	0.03623
0.645161	0.08037	0.0505	0.0391	0.03627	0.03559	0.03399
0.677419	0.07781	0.0495	0.03809	0.03484	0.03442	0.03368
0.709677	0.07777	0.04866	0.03667	0.03463	0.03413	0.03174
0.741935	0.07417	0.04769	0.03382	0.03127	0.03075	0.02807
0.774194	0.07305	0.04507	0.03306	0.02938	0.02872	0.02686
0.806452	0.06753	0.04173	0.03076	0.02857	0.02771	0.02605
0.83871	0.06684	0.03966	0.0299	0.02638	0.02555	0.02218
0.870968	0.05292	0.03922	0.02231	0.01982	0.01962	0.01604
0.903226	0.04651	0.01883	0.01267	0.01074	0.01052	0.008686
0.935484	0.04032	0.01336	0.007205	0.006205	0.005691	0.004082
0.967742	0.02717	0.01068	0.003309	0.00212	0.001986	0.000868
0.1	0.1683	0.068342	0.048405	0.044975	0.043755	0.04172
					Average of yearly averages:	0.033202

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: GApecan low

Metfile:	w93805.dvf			
PRZM scenario:	GAPecansSTD.txt			
EXAMS environment file:	pond298.exv			
Chemical Name:	emamectin benzoate			
Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	964.23	g/mol	
Henry's Law Const.	henry	3.80E-10	atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	930	mg/L	
Kd	Kd		mg/L	
Koc	Koc	265687	mg/L	
Photolysis half-life	kdp	23	days	Half-life
Aerobic Aquatic Metabolism	kbacw	1158	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1281	days	Halfife
Aerobic Soil Metabolism	asm	579	days	Halfife
Hydrolysis:	pH 5	0	days	Half-life
Hydrolysis:	pH 7	0	days	Half-life
Hydrolysis:	pH 9	0	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI	0	cm	
Application Rate:	TAPP	0.0168	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	16-05	dd/mm or dd/mmm or dd-mm or dd-mmm	

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Interval 1	interval	7	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.0168	kg/ha	
Interval 2	interval	7	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.0168	kg/ha	
Record 17:	FILTRA			
	IPSCND	1		
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT			
	FEXTRC	0.5		
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

stored as GApecan low.out
Chemical: emamectin benzoate
PRZM environment:
GAPecansSTD.txt modified Tueday, 29 May 2007 at 12:55:08
EXAMS environment:
pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w93805.dvf modified Wedday, 3 July 2002 at 09:04:32
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.02717	0.01068	0.003309	0.00212	0.001986	0.000868
1962	0.04032	0.01336	0.007205	0.006205	0.005691	0.004082
1963	0.04651	0.01883	0.01267	0.01074	0.01052	0.008686
1964	0.1098	0.03966	0.02231	0.01982	0.01962	0.01604
1965	0.1379	0.05191	0.03076	0.02638	0.02555	0.02218
1966	0.1696	0.06243	0.03382	0.02938	0.02872	0.02605
1967	0.07417	0.03922	0.0299	0.02857	0.02771	0.02686
1968	0.1196	0.0505	0.03306	0.03127	0.03075	0.02807
1969	0.1169	0.05845	0.03809	0.03463	0.03413	0.03174
1970	0.1272	0.0577	0.0391	0.03627	0.03559	0.03399
1971	0.06684	0.04173	0.03667	0.03484	0.03442	0.03368
1972	0.2101	0.0806	0.04647	0.04051	0.03933	0.03623
1973	0.08723	0.05053	0.04222	0.03982	0.03946	0.03816
1974	0.08247	0.05107	0.04022	0.03859	0.03814	0.03739
1975	0.08698	0.05796	0.04359	0.04122	0.041	0.03966
1976	0.1005	0.05591	0.0453	0.04307	0.04265	0.04112
1977	0.06753	0.04769	0.04258	0.04215	0.04204	0.04091
1978	0.1066	0.05613	0.04176	0.04048	0.04023	0.03965
1979	0.09133	0.05412	0.04418	0.04254	0.04192	0.0412
1980	0.08037	0.05585	0.04404	0.04189	0.04193	0.0413
1981	0.07305	0.04866	0.04213	0.04148	0.04106	0.03946
1982	0.2345	0.08946	0.05099	0.04502	0.04376	0.04003
1983	0.07777	0.05108	0.04305	0.04164	0.04117	0.04029
1984	0.05292	0.04507	0.04192	0.0412	0.04099	0.03971
1985	0.1566	0.0685	0.04597	0.04457	0.04254	0.03961
1986	0.1174	0.06085	0.04616	0.04406	0.04371	0.04238
1987	0.1037	0.06489	0.04862	0.04529	0.04483	0.04311
1988	0.07781	0.0495	0.04411	0.04308	0.04289	0.04145
1989	0.1381	0.06692	0.05021	0.04599	0.04482	0.04175

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1990	0.08904	0.05163	0.04264	0.04161		0.04147	0.04041

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day		Yearly
0.032258	0.2345	0.08946	0.05099	0.04599		0.04483	0.04311
0.064516	0.2101	0.0806	0.05021	0.04529		0.04482	0.04238
0.096774	0.1696	0.0685	0.04862	0.04502		0.04376	0.04175
0.129032	0.1566	0.06692	0.04647	0.04457		0.04371	0.04145
0.16129	0.1381	0.06489	0.04616	0.04406		0.04289	0.0413
0.193548	0.1379	0.06243	0.04597	0.04308		0.04265	0.0412
0.225806	0.1272	0.06085	0.0453	0.04307		0.04254	0.04112
0.258065	0.1196	0.05845	0.04418	0.04254		0.04204	0.04091
0.290323	0.1174	0.05796	0.04411	0.04215		0.04193	0.04041
0.322581	0.1169	0.0577	0.04404	0.04189		0.04192	0.04029
0.354839	0.1098	0.05613	0.04359	0.04164		0.04147	0.04003
0.387097	0.1066	0.05591	0.04305	0.04161		0.04117	0.03971
0.419355	0.1037	0.05585	0.04264	0.04148		0.04106	0.03966
0.451613	0.1005	0.05412	0.04258	0.04122		0.041	0.03965
0.483871	0.09133	0.05191	0.04222	0.0412		0.04099	0.03961
0.516129	0.08904	0.05163	0.04213	0.04051		0.04023	0.03946
0.548387	0.08723	0.05108	0.04192	0.04048		0.03946	0.03816
0.580645	0.08698	0.05107	0.04176	0.03982		0.03933	0.03739
0.612903	0.08247	0.05053	0.04022	0.03859		0.03814	0.03623
0.645161	0.08037	0.0505	0.0391	0.03627		0.03559	0.03399
0.677419	0.07781	0.0495	0.03809	0.03484		0.03442	0.03368
0.709677	0.07777	0.04866	0.03667	0.03463		0.03413	0.03174
0.741935	0.07417	0.04769	0.03382	0.03127		0.03075	0.02807
0.774194	0.07305	0.04507	0.03306	0.02938		0.02872	0.02686
0.806452	0.06753	0.04173	0.03076	0.02857		0.02771	0.02605
0.83871	0.06684	0.03966	0.0299	0.02638		0.02555	0.02218
0.870968	0.05292	0.03922	0.02231	0.01982		0.01962	0.01604
0.903226	0.04651	0.01883	0.01267	0.01074		0.01052	0.008686
0.935484	0.04032	0.01336	0.007205	0.006205		0.005691	0.004082
0.967742	0.02717	0.01068	0.003309	0.00212		0.001986	0.000868
0.1	0.1683	0.068342	0.048405	0.044975		0.043755	0.04172
					Average of yearly averages:		0.033202

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: GApecan low

Metfile:	w93805.dvf
PRZM scenario:	GAPecansSTD.txt
EXAMS environment file:	pond298.exv
Chemical Name:	emamectin benzoate

Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	964.23	g/mol	
Henry's Law Const.	henry	3.80E-10	atm-m^3/mol	

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Vapor Pressure	vapr		torr	
Solubility	sol	930	mg/L	
Kd	Kd		mg/L	
Koc	Koc	265687	mg/L	
Photolysis half-life	kdp	23	days	Half-life
Aerobic Aquatic Metabolism	kbacw	1158	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1281	days	Halfife
Aerobic Soil Metabolism	asm	579	days	Halfife
Hydrolysis:	pH 5	0	days	Half-life
Hydrolysis:	pH 7	0	days	Half-life
Hydrolysis:	pH 9	0	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI	0	cm	
Application Rate:	TAPP	0.0168	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	16-05	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.0168	kg/ha	
Interval 2	interval	7	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.0168	kg/ha	
Record 17:	FILTRA			
	IPSCND	1		
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT			
	FEXTRC	0.5		
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

stored as CA almond low.out
Chemical: emamectin benzoate
PRZM environment:
CAalmond_WirrigSTD.txt modified Wedday, 13 June 2007 at 11:17:16
EXAMS environment:
pond298.exv modified Thuday, 29 August 2002 at 16:33:30
Metfile: w23232.dvf modified Wedday, 3 July 2002 at 09:04:22
Water segment concentrations (ppb)

Year	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
1961	0.005265	0.001454	0.000858	0.000612	0.000578	0.000429
1962	0.0306	0.0115	0.004133	0.002955	0.002661	0.001628
1963	0.007741	0.004375	0.003389	0.003192	0.003164	0.003029
1964	0.01036	0.005455	0.004076	0.003835	0.003799	0.003664
1965	0.009062	0.005251	0.004659	0.004341	0.004315	0.004173
1966	0.009387	0.005575	0.004983	0.00474	0.004708	0.004562
1967	0.01699	0.008123	0.005836	0.005555	0.005424	0.005269
1968	0.0104	0.006587	0.005998	0.005687	0.00567	0.005511

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1969	0.01087	0.007337	0.006606	0.006117	0.006082	0.005955
1970	0.01388	0.009096	0.006929	0.006504	0.006437	0.006344
1971	0.01159	0.007776	0.007187	0.006834	0.006811	0.006645
1972	0.01173	0.007916	0.007329	0.006931	0.006913	0.00679
1973	0.0174	0.009742	0.008149	0.007561	0.007475	0.007345
1974	0.01241	0.008594	0.008014	0.007577	0.007507	0.007389
1975	0.01295	0.008634	0.008071	0.007673	0.007659	0.007482
1976	0.01245	0.008637	0.008049	0.007886	0.007844	0.007588
1977	0.01262	0.008811	0.008224	0.007912	0.0079	0.007723
1978	0.01354	0.00956	0.008833	0.00844	0.008335	0.008167
1979	0.01347	0.009624	0.008979	0.008469	0.008382	0.008259
1980	0.01443	0.01025	0.009347	0.008747	0.008645	0.008432
1981	0.01342	0.01001	0.009018	0.00861	0.008531	0.008458
1982	0.02379	0.01282	0.01016	0.00966	0.009577	0.009342
1983	0.01496	0.01096	0.01019	0.009853	0.009814	0.009613
1984	0.01457	0.01076	0.01017	0.009724	0.00965	0.009463
1985	0.01513	0.01062	0.009951	0.009471	0.009395	0.009227
1986	0.03088	0.01729	0.01173	0.01053	0.0103	0.009809
1987	0.01469	0.01087	0.01032	0.009966	0.009879	0.009653
1988	0.01449	0.01068	0.01009	0.009663	0.009599	0.009402
1989	0.01425	0.01044	0.009851	0.009469	0.009386	0.009258
1990	0.018	0.01148	0.01022	0.009752	0.009644	0.009417

Sorted results

Prob.	Peak	96 hr	21 Day	60 Day	90 Day	Yearly
0.032258	0.03088	0.01729	0.01173	0.01053	0.0103	0.009809
0.064516	0.0306	0.01282	0.01032	0.009966	0.009879	0.009653
0.096774	0.02379	0.0115	0.01022	0.009853	0.009814	0.009613
0.129032	0.018	0.01148	0.01019	0.009752	0.00965	0.009463
0.16129	0.0174	0.01096	0.01017	0.009724	0.009644	0.009417
0.193548	0.01699	0.01087	0.01016	0.009663	0.009599	0.009402
0.225806	0.01513	0.01076	0.01009	0.00966	0.009577	0.009342
0.258065	0.01496	0.01068	0.009951	0.009471	0.009395	0.009258
0.290323	0.01469	0.01062	0.009851	0.009469	0.009386	0.009227
0.322581	0.01457	0.01044	0.009347	0.008747	0.008645	0.008458
0.354839	0.01449	0.01025	0.009018	0.00861	0.008531	0.008432
0.387097	0.01443	0.01001	0.008979	0.008469	0.008382	0.008259
0.419355	0.01425	0.009742	0.008833	0.00844	0.008335	0.008167
0.451613	0.01388	0.009624	0.008224	0.007912	0.0079	0.007723
0.483871	0.01354	0.00956	0.008149	0.007886	0.007844	0.007588
0.516129	0.01347	0.009096	0.008071	0.007673	0.007659	0.007482
0.548387	0.01342	0.008811	0.008049	0.007577	0.007507	0.007389
0.580645	0.01295	0.008637	0.008014	0.007561	0.007475	0.007345
0.612903	0.01262	0.008634	0.007329	0.006931	0.006913	0.00679
0.645161	0.01245	0.008594	0.007187	0.006834	0.006811	0.006645
0.677419	0.01241	0.008123	0.006929	0.006504	0.006437	0.006344
0.709677	0.01173	0.007916	0.006606	0.006117	0.006082	0.005955
0.741935	0.01159	0.007776	0.005998	0.005687	0.00567	0.005511
0.774194	0.01087	0.007337	0.005836	0.005555	0.005424	0.005269
0.806452	0.0104	0.006587	0.004983	0.00474	0.004708	0.004562

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0.83871	0.01036	0.005575	0.004659	0.004341	0.004315	0.004173
0.870968	0.009387	0.005455	0.004133	0.003835	0.003799	0.003664
0.903226	0.009062	0.005251	0.004076	0.003192	0.003164	0.003029
0.935484	0.007741	0.004375	0.003389	0.002955	0.002661	0.001628
0.967742	0.005265	0.001454	0.000858	0.000612	0.000578	0.000429
0.1	0.023211	0.011498	0.010217	0.009843	0.009798	0.009598
					Average of yearly averages:	0.007001

Inputs generated by pe5.pl - Novemeber 2006

Data used for this run:
Output File: CA almond low

Metfile:	w23232.dvf			
PRZM scenario:	CAalmond_WirrigSTD.txt			
EXAMS environment file:	pond298.exv			
Chemical Name:	emamectin benzoate			
Description	Variable Name	Value	Units	Comments
Molecular weight	mwt	964.23	g/mol	
Henry's Law Const.	henry	3.80E-10	atm-m^3/mol	
Vapor Pressure	vapr		torr	
Solubility	sol	930	mg/L	
Kd	Kd		mg/L	
Koc	Koc	265687	mg/L	
Photolysis half-life	kdp	23	days	Half-life
Aerobic Aquatic Metabolism	kbacw	1158	days	Halfife
Anaerobic Aquatic Metabolism	kbacs	1281	days	Halfife
Aerobic Soil Metabolism	asm	579	days	Halfife
Hydrolysis:	pH 5	0	days	Half-life
Hydrolysis:	pH 7	0	days	Half-life
Hydrolysis:	pH 9	0	days	Half-life
Method:	CAM	2	integer	See PRZM manual
Incorporation Depth:	DEPI	0	cm	
Application Rate:	TAPP	0.0168	kg/ha	
Application Efficiency:	APPEFF	0.99	fraction	
Spray Drift	DRFT	0.01	fraction of application rate applied to pond	
Application Date	Date	2-Aug	dd/mm or dd/mmm or dd-mm or dd-mmm	
Interval 1	interval	7	days	Set to 0 or delete line for single app.
app. rate 1	apprate	0.0168	kg/ha	
Interval 2	interval	7	days	Set to 0 or delete line for single app.
app. rate 2	apprate	0.0168	kg/ha	
Record 17:	FILTRA			
	IPSCND	1		
	UPTKF			
Record 18:	PLVKRT			
	PLDKRT			
	FEXTRC	0.5		
Flag for Index Res. Run	IR	EPA Pond		
Flag for runoff calc.	RUNOFF	none	none, monthly or total(average of entire run)	

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Appendix C. T-REX (Terrestrial Exposure Model for Birds and Mammals) Input and Output

This appendix describes how the model, T-REX version 1.2.3, estimates the following: (1) residue concentrations on selected food items (mg/kg-dietary item); (2) dose-based EECs (mg/kg-bw) from dietary concentrations on selected food items; (3) adjusted toxicity values; and risk quotients for birds and mammals.

(1) ***Calculation of dietary concentrations on selected food items***

T-REX calculates the pesticide residue concentrations on each selected food item on a daily interval for one year. When multiple applications are modeled, residue concentrations resulting from the final application and remaining residue from previous applications are summed. The maximum concentration calculated out of the 365 days is returned as the EEC used to estimate potential risk to birds and mammals as described below. Dissipation of a chemical applied to foliar surfaces for single or multiple applications is calculated assuming a first order decay rate from the following first order rate equation:

$$C_t = C_0 e^{-kt}$$

or in log form:

$$\ln(C_t) = \ln(C_0)(-kT)$$

Where:

C_t = concentration, parts per million (mg/kg), at time T.

C_0 = concentration (mg/kg), present initially (on day zero) on the surface of selected food items. C_0 is calculated by multiplying the application rate, in pounds active ingredient per acre, by 240 for short grass, 110 for tall grass, and 135 for broad-leafed plants/small insects and 15 for fruits/pods/large insects for upper bound residue levels. Mean residue levels are derived by multiplying the application rate by 85 for short grass, 36 for tall grass, and 45 for broad-leafed plants/small insects and 7 for fruits/pods/seeds/large insects. Residue levels are based on work by Hoerger and Kenaga (1972) as modified by Fletcher *et al.* (1994). Additional applications are converted from pounds active ingredient per acre to ppm on the plant surface and the additional mass added to the mass of the chemical still present on the surfaces on the day of application.

k = Exponential rate constant = ln 2 ÷ foliar dissipation half-life. When scientifically valid, statistically robust data are not available, EFED recommends the using a default foliar dissipation half-life value of 35 days. The use of the 35-day half-life is based on the highest reported value (36.9 days), as reported by Willis and McDowell (1987).

t = time, in days, since the start of the simulation. The initial application is on day 0. The simulation is designed to run for 365 days.

The dietary concentrations estimated using the above methodology may be used directly to calculate risk quotients, but may also be used to calculate dose-based EECs (mg/kg-bw) for various size classes of mammals and birds as described below.

(2) ***Calculating EEC Equivalent Doses based on Estimated Dietary Concentrations on Selected Bird and Mammal Food Items***

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EECs (mg/kg-bw) for various size classes of mammals and birds may be calculated based on the dietary residue concentrations derived using the equations presented above. To allow for this type of analysis, the EECs and toxicity values are adjusted based on food intake and body weight differences so that they are comparable for a given weight class of animal. The size classes assessed are small (20-gram), medium (100-gram), and large (1000-gram) birds, and small (15-gram), medium (35-gram), and large (1000-gram) mammals. Equations used to calculate food intake (grams/day) and to adjust toxicity values for dose-based risk quotients are presented below.

Calculating Food Intake for Different Size Classes of Birds and Mammals:

Daily food intake (g/day) is assumed to correlate with body weight using the following empirically derived equation (U.S. EPA, 1993):

Avian consumption

$$F = \frac{0.648 * BW^{0.651}}{(1 - W)}$$

where:

F = food intake in grams of fresh weight per day (g/day)
BW = body mass of animal (g)
W = mass fraction of water in the food (EFED value = 0.8 for birds and herbivorous mammals, 0.1 for granivorous mammals)

Based on this equation, a 20-gram bird would consume 22.8 grams of food daily (114% of its body weight), a 100-gram bird would consume 65 grams of food daily (65% of its body weight daily), and 1000-gram bird would consume 290 grams of food daily (29% of its body weight). These data, together with the residue concentrations (mg/kg-food item) on selected food items calculated from the Kenaga nomogram, are used to estimate the dose (mg/kg-bw) of residue consumed by the three size classes of birds as discussed below. Using a 20-gram bird as an example, a dietary concentration of 100 mg/kg-diet (ppm) x 1.14 kg diet/kg bw (114%) would result in an equivalent dose-based EEC of 114 mg/kg-bw. T-REX calculates food intake based on dry weight and wet weight of food items. The dose-based assessment uses the wet weight food consumption values by assuming that dietary items are 80% water by weight. However, if dietary items of a species being assessed are known, then a refined dose-based EEC can be calculated using appropriate water fractions of the food items.

A similar relationship between body weight and food intake has been derived for mammals (U.S. EPA 1993):

Mammalian food consumption (g/day)

$$F = \frac{0.621 * BW^{0.564}}{(1 - W)}$$

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where:

F = food intake in grams of fresh weight per day (g/day)
BW = body mass of animal (g)
W = mass fraction of water in the food (EFED value = 0.8 for birds and herbivorous mammals, 0.1 for granivorous mammals)

The scaling factors result in a percent body weight consumed presented in the following table for each weight class of mammal. These values are used in the same manner described for birds to calculate dose-based EECs (mg/kg-bw). Note the difference in food intake of grainivores compared with herbivores and insectivores. This is caused by the difference in the assumed mass fraction of water in their diets.

Organism and body weight	Food intake (g day^{-1})[a]	Percent body weight consumed (day^{-1})[a]
15 g	14.3 / 3.2	95 / 21
35 g	23 / 5.1	66 / 15
1000 g	150 / 34	15 / 3

[a] The first number in this column is specific to herbivores/insectivores. The second number is for granivores. These groups have markedly different consumption requirements.

T-REX calculates food intake based on dry weight and wet weight of food items (wet weight is used for RQ calculations). The dose-based assessment uses the wet weight food consumption values by assuming that dietary items are 80% water by weight (10% for granivores). However, if dietary items of a species being assessed are known, then a refined dose-based EEC can be calculated using appropriate water fractions of the food items.

(3) ***Calculating Adjusted Toxicity Values***

The dose-based EECs (mg/kg-bw) derived above are compared with LD_{50} or NOAEL (mg/kg-bw) values from acceptable or supplemental toxicity studies that are adjusted for the size of the animal tested compared with the size of the animal being assessed (e.g., 20-gram bird). These exposure values are presented as mass of pesticide consumed per kg body weight of the animal being assessed (mg/kg-bw). EECs and toxicity values are relative to the animal's body weight (mg residue/kg bw) because consumption of the same mass of pesticide residue results in a higher body burden in smaller animals compared with larger animals. For birds, only acute values (LD_{50}s) are adjusted because dose-based risk quotients are not calculated for the chronic risk estimation. Adjusted mammalian LD_{50}s and reproduction NOAELs (mg/kg-bw) are used to calculate dose-based acute and chronic risk quotients for 15-, 35-, and 1000-gram mammals. The following equations are used for the adjustment (U.S. EPA 1993):

Adjusted avian LD_{50}:

$$Adj.LD_{50} = LD_{50}\left(\frac{AW}{TW}\right)^{(x-1)}$$

where:

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Adj. LD_{50} = adjusted LD_{50} (mg/kg-bw) calculated by the equation
LD_{50} = endpoint reported from bird study (mg/kg-bw)
TW = body weight of tested animal (178g bobwhite; 1580g mallard; 350g rat)
AW = body weight of assessed animal (*avian*: 20g, 100g, and 1000g)
x = Mineau scaling factor for birds; EFED default 1.15

Adjusted mammalian NOAELs and LD_{50}s (note that the same equation is used to adjust the NOAEL):

$$Adj.NOAEL\ or\ LD_{50} = NOAEL\ or\ LD_{50}\left(\frac{TW}{AW}\right)^{(0.25)}$$

where:

Adj. NOAEL or LD_{50} = adjusted NOAEL or LD_{50} (mg/kg-bw)
NOAEL or LD_{50} = endpoint reported from bird study (mg/kg-bw)
TW = body weight of tested animal (350g rat)
AW = body weight of assessed animal (15g, 35g, 1000g)

(4) ***Calculating Risk Quotients***

Two types of risk quotients are calculated by T-REX based on the estimated dietary residue concentrations determined from the Kenaga nomogram: (1) dietary based RQs; and (2) dose based RQs. These RQs are not equivalent. Dietary risk quotients are calculated by directly comparing the concentration of a pesticide administered (or estimated to be administered) to experimental animals in the diet in a toxicity study to the concentration estimated to be on selected food items. These risk quotients do not account for the fact that smaller-sized animals need to consume more food relative to their body weight than larger animals or those differential amounts of food are consumed depending on the water content and nutritive value of the food. The dose-based risk quotients do account for these factors. The dose-based RQs incorporate the ingestion rate-adjusted exposure from the various food items to the different weight classes of birds and the weight class-scaled toxicity endpoints. Formulas presented below are used to calculate dose-based and dietary based risk quotients:

Duration	Dose or Dietary RQ	Surrogate Organism	Equation
Acute	Dose-based	Birds and mammals	Acute Daily Exposure (mg/kg-bw) / adjusted LD_{50} (mg/kg-bw)
	Dietary-based	Birds	*Kenaga* EEC (mg/kg-food item) / LC_{50} (mg/kg-diet)
Chronic	Dietary-based	Birds and mammals	EEC (mg/kg-food item) / NOAEC (mg/kg-diet)
	Dose-based	Mammals only	EEC (mg/kg-bw) / Adjusted NOAEL (mg/kg-bw)

These risk quotients are compared to the Agency's LOCs to determine if risk is greater than EFED's concern level.

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Tree Nuts Crop Group and Pistachios – Input parameters and EECs

Upper Bound Kenaga Residues For RQ Calculation	
Chemical Name:	Emamectin Benzoate
Use:	Tree Nuts Crop Group and Pistachios
Formulation:	PROCLAIM Insecticide
Application Rate:	0.015 lbs a.i./acre
Half-life:	6.2 days
Application Interval:	7 days
Maximum # Apps./Year:	3 times
Length of Simulation:	1 year

Endpoints			
Avian	Mallard duck	LD50 (mg/kg-bw) =	46.00
	Mallard duck	LC50 (mg/kg-diet) =	570.00
	Mallard duck	NOAEL(mg/kg-bw) =	0.00
	Mallard duck	NOAEC (mg/kg-diet) =	40.00
Mammals		Mouse LD50 (mg/kg-bw)	22.00
		LC50 (mg/kg-diet)	0.00
		NOAEL (mg/kg-bw)	0.6
		NOAEC (mg/kg-diet)	12.00

Dietary-based EECs (mg/kg)	Kenaga Values
Short Grass	6.00
Tall Grass	2.75
Broadleaf plants/small insects	3.37
Fruits/pods/seeds/large insects	0.37

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Tree Nuts Crop Group and Pistachios – UPPER-BOUND Kenaga residue EECs and RQs; asterisk (*) indicates RQ > LOC

Summary of Risk Quotient Calculations Based on Upper Bound Kenaga EECs

Upper Bound Kenaga, Acute Avian Dose-Based Risk Quotients									
Size Class (grams)	Adjusted LD50	EECs and RQs							
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
20	23.88	6.83	**0.29***	3.13	**0.13***	3.84	**0.16***	0.43	0.02
100	30.41	3.9	**0.13***	1.79	0.06	2.19	0.07	0.24	0.01
1000	42.95	1.74	0.04	0.8	0.02	0.98	0.02	0.11	0.00

Upper Bound Kenaga, Subacute Avian Dietary Based Risk Quotients								
LC50	EECs and RQs							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
570	6.00	0.01	2.75	0.00	3.37	0.01	0.37	0.00

Size class not used for dietary risk quotients

Upper Bound Kenaga, Chronic Avian Dietary Based Risk Quotients								
NOAEC	EECs and RQs							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
40	6.00	0.15	2.75	0.07	3.37	0.08	0.37	0.01

Size class not used for dietary risk quotients

Upper Bound Kenaga, Acute Mammalian Dose-Based Risk Quotients											
Size Class (grams)	Adjusted LD50	EECs and RQs									
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects		Granivore	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
15	23.63	5.72	**0.24***	2.62	**0.11***	3.22	**0.14***	0.36	0.02	0.08	0.00
35	19.14	3.95	**0.21***	1.81	0.09	2.22	**0.12***	0.25	0.01	0.05	0.00
1000	8.27	0.92	**0.11***	0.42	0.05	0.52	0.06	0.06	0.00	0.01	0.00

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Upper Bound Kenaga, Acute Mammalian Dietary Based Risk Quotients								
LC50	EECs and RQs							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
0	6.00	##	2.75	##	3.37	##	0.37	##

Size class not used for dietary risk quotients

Upper Bound Kenaga, Chronic Mammalian Dietary Based Risk Quotients								
NOAEC	EECs and RQs							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
12	6.00	0.5	2.75	0.23	3.37	0.28	0.37	0.03

Size class not used for dietary risk quotients

Upper Bound Kenaga, Chronic Mammalian Dose-Based Risk Quotients											
Size Class (grams)	Adjusted NOAEL	EECs and RQs									
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects		Granivore	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
15	1.32	5.72	**4.34***	2.62	**1.99***	3.22	**2.44***	0.36	0.27	0.08	0.06
35	1.07	3.95	**3.7***	1.81	**1.7***	2.22	**2.08***	0.25	0.23	0.05	0.05
1000	0.46	0.92	**1.99***	0.42	0.91	0.52	**1.12***	0.06	0.12	0.01	0.03

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Tree Nuts Crop Group and Pistachios – MEAN Kenaga residue EECs and RQs; asterisk (*) indicates RQ > LOC

Summary of Risk Quotient Calculations Based on Mean Kenaga EECs

Mean Kenaga, Acute Avian Dose-Based Risk Quotients									
Size Class (grams)	Adjusted LD50	EECs and RQs							
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
20	23.88	2.42	**0.1***	1.03	0.043	1.28	0.054	0.2	0.008
100	30.41	1.38	0.045	0.58	0.019	0.73	0.024	0.1	0.004
1000	42.95	0.62	0.014	0.26	0.006	0.33	0.008	0.05	0.001

Mean Kenaga, Subacute Avian Dietary Based Risk Quotients								
LC50	EECs and RQs							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
570	2.12	0.004	0.9	0.002	1.12	0.002	0.17	0.00

Size class not used for dietary risk quotients

Mean Kenaga, Chronic Avian Dietary Based Risk Quotients								
NOAEC	EECs and RQs							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
40	2.12	0.053	0.9	0.022	1.12	0.028	0.17	0.004

Size class not used for dietary risk quotients

Mean Kenaga, Acute Mammalian Dose-Based Risk Quotients											
Size Class (grams)	Adjusted LD50	EECs and RQs									
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects		Granivore	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
15	23.63	2.02	0.09	0.85	0.04	1.07	0.05	0.17	0.00	0.04	0.00
35	19.14	1.4	0.07	0.59	0.03	0.74	0.04	0.12	0.00	0.03	0.00
1000	8.27	0.32	0.04	0.13	0.02	0.17	0.02	0.03	0.00	0.01	0.00

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Mean Kenaga, Acute Mammalian Dietary Based Risk Quotients								
LC50	EECs and RQs							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
0	2.12	##	0.9	##	1.12	##	0.17	##

Size class not used for dietary risk quotients

Mean Kenaga, Chronic Mammalian Dietary Based Risk Quotients								
NOAEC	EECs and RQs							
	Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects	
	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
12	2.12	0.177	0.9	0.075	1.12	0.094	0.17	0.015

Size class not used for dietary risk quotients

Mean Kenaga, Chronic Mammalian Dose-Based Risk Quotients											
Size Class (grams)	Adjusted NOAEL	EECs and RQs									
		Short Grass		Tall Grass		Broadleaf Plants/ Small Insects		Fruits/Pods/ Seeds/ Large Insects		Granivore	
		EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ	EEC	RQ
15	1.32	2.02	**1.531***	0.85	0.648	1.07	0.81	0.17	0.126	0.04	0.03
35	1.07	1.4	**1.214***	0.59	0.557	0.74	0.696	0.12	0.108	0.03	0.02
1000	0.46	0.32	0.691	0.13	0.292	0.17	0.366	0.03	0.057	0.01	0.01

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APPENDIX D – ECOLOGICAL EFFECT TOXICITY DATA

Available Ecological Effect Data

In this risk assessment, surrogate test species of birds, mammals, fish, aquatic and terrestrial invertebrates and plants are used to estimate treatment-related direct effects on acute mortality or immobility and chronic reproduction, growth, and survival of non-target species. Toxicity test values (*i.e.*, measures of effect) are derived from the results of registrant-required animal toxicity studies that are consistent with and meet toxicity testing guidelines (FIFRA 40 CFR Part 158 and 160). Toxicity tests include short-term acute, subacute, and reproduction/chronic studies that progress from basic laboratory tests to applied field studies. In addition, avian species are used as surrogates for reptiles and freshwater fish species are used as surrogates for aquatic-phase amphibians.

A. Toxicity to Terrestrial Animals

i. Birds, Acute and Subacute

An acute oral toxicity study using the technical grade of the active ingredient (TAI) is required to establish the toxicity of emamectin benzoate to birds. The preferred test species is either mallard duck (waterfowl) or bobwhite quail (upland gamebird). Results of this test are tabulated in table D1 below.

Table D1. Avian Acute Oral Toxicity

Species	% ai	LD_{50} (mg ai/kg- bw)	Toxicity Category*	MRID No. Author/Year	Study Classification[1]
Northern bobwhite quail *(Colinus virginianus)*	95.9	264 [A]	moderately toxic	42868905 (Campbell, Jabers & Beavers, 1993)	Acceptable
Mallard duck *(Anas platyrhynchos)*	95.9	46 [B]	highly toxic	42743601 (Campbell & Jaber, 1992)	Acceptable

*Toxicity Category for Birds and Mammals via Oral Route: <10 = very highly toxic; 10 - 50 = highly toxic; 51 -500 = moderately toxic; 501 -2000 = slightly toxic; >2000 = practically non-toxic.

[1] Acceptable (study satisfies guideline); Supplemental (study is scientifically sound, but does not satisfy guideline); Invalid (study is not scientifically sound and does not satisfy guideline).

[A] Quail 95% Confidence Intervals = 201 – 349 mg ai/kg bw; Probit slope (95% C.I.) = 7.15 (2.8 – 11.0).

[B] Duck 95% Confidence Intervals = 30 – 69 mg ai/kg bw; Probit slope (95% C.I.) = 3.5 (1.9 – 5.2).

Emamectin benzoate is categorized as highly toxic to avian species on an acute oral basis. The guideline (OPPTS 850.2100) requirement is fulfilled (MRIDs 42868905 and 42743601).

Two subacute dietary studies using the TGAI are required to establish the toxicity of emamectin benzoate to birds. The preferred test species are mallard duck and bobwhite quail. Results of these tests are tabulated in Table D2 below.

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Table D2. Avian Subacute Dietary Toxicity					
Species	**% ai**	**5-Day LC_{50} (mg ai/kg-diet)[1]**	**Toxicity Category***	**MRID No. Author/Year**	**Study Classification**
Northern bobwhite quail *(Colinus virginianus)*	95.9	1,318 [A]	slightly toxic	42851527 (Campbell, 1993)	Acceptable
Mallard duck *(Anas platyrhynchos)*	95.9	570 [B]	moderately toxic	42851528 (Campbell, 1993)	Acceptable

*Toxicity Category for Birds and Mammals via Dietary Route: <50 = very highly toxic; 50 - 500 = highly toxic; 501 - 1000 = moderately toxic; 1001 - 5000 = slightly toxic; >5000 = practically non-toxic.

[1] Test organisms observed an additional three days while on untreated feed.

[A] Quail 95% Confidence Intervals = 1008 – 1729 mg ai/kg bw, Probit slope (95% C.I.) = 7.2 (2.9 - 11).

[B] Duck 95% Confidence Intervals = 391 – 915 mg ai/kg bw, Probit slope (95% C.I.) = 2.8 (1.5 – 4.2).

Emamectin benzoate is categorized as moderately toxic to avian species on a subacute dietary basis. The guideline (OPPTS 850.2200) requirement is fulfilled (MRIDs 42851527 and 42851528).

ii. Birds, Chronic

Avian reproduction studies using the TGAI are required for emamectin benzoate because birds may be subject to repeated or continuous exposure to this pesticide, especially preceding or during the breeding season. The preferred test species are mallard duck and bobwhite quail. Results are tabulated in Table D3 below.

Table D3. Avian Reproduction					
Species/ Study Duration	**% ai**	**NOAEC/ LOAEC (mg ai/kg-diet)**	**Toxicity Endpoints**	**MRID No. Author/Year**	**Study Classification**
Northern bobwhite quail *(Colinus virginianus)*	94.6	NOAEC=125 LOAEC>125	No adverse effects observed at any endpoint	44007911 (Beavers et. al, 1995; amended 1996)	Supplemental[1]
Mallard duck *(Anas platyrhynchos)*	94.6	NOAEC=40 LOAEC>40	No adverse effects observed at any endpoint	44007910 (Beavers et. al, 1995; amended 1996)	Supplemental[1]

[1] These studies are considered as supplemental since LOAEC values were not determined. However, if avian exposures do not exceed 40 mg/kg-diet, additional testing is not required.

The guideline (OPPTS 850.2300) requirement is fulfilled (MRIDs 44007910 and 44007911), as specified above.

iii. Mammals, Acute

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Wild mammal testing is not required for emamectin benzoate. Mammalian toxicity values obtained from the Agency's Health Effects Division (HED) substitute for wild mammal testing. These toxicity values are reported below in Table D4.

Table D4. Mammalian Toxicity/Acute Oral and Dermal Toxicity

Species/ Study Duration	Formulation	LD_{50} (mg ai/kg)	Toxicity Category	MRID No.
Laboratory rat - oral (*Rattus norvegicus*)	92.8% ai	Males: 88 Female 76	moderately toxic	42743612
Laboratory mouse *(Mus musculus)*	92.8% ai	Male: 22 Female: 31	highly toxic	42743612
Laboratory rat - oral (neural lesions) (*Rattus norvegicus*)	96.9% ai	Male: 67	moderately toxic	42743618
Laboratory rat - oral (neural lesions) (*Rattus norvegicus*)	92.8% ai	Female: 70	moderately toxic	42743618
Laboratory rat - oral (neural lesions) (*Rattus norvegicus*)	96.9% ai	Male & Female: >25	moderately toxic	42743619
Laboratory rat - oral (*Rattus norvegicus*)	0.16 EC (1.94% ai)	Female: 63 mg ai/kg	moderately toxic	42743605
Rabbit - dermal	0.16 EC (1.94% ai)	> 38.8 mg ai/kg	highly toxic	42743606

The above studies were classified as acceptable by HED. The mammalian acute toxicity value used in this risk assessment is 22 mg/kg based on the male mouse. In addition, the reported toxic signs were tremors, ataxia, bradypnea and loss of righting reflex.

iv. Mammals, Chronic

Wild mammal testing is not required for emamectin benzoate. Mammalian toxicity values obtained from the Agency's Health Effects Division (HED) substitute for wild mammal testing. These toxicity values are reported below. Chronic toxicity values are reported below in Table D5.

Table D5. Mammalian Reproduction

Species/ Study Duration	% ai	NOAEC/ LOAEC (mg ai/kg-diet)	Toxicity Endpoints	MRID No.
Laboratory rat (*Rattus norvegicus*)	Tech.	NOAEC = 12 LOAEC = 36	Decreased fecundity	42851511

v. Beneficial Insects

A honeybee acute contact study using the TGAI is required for emamectin benzoate because its use in vegetables may result in honeybee exposure. A honeybee toxicity of residues on foliage study using the typical end-use product is required because its use may result in honeybee

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exposure and the acute contact honeybee LD_{50} is less than 2 µg ai/bee. Results of these tests are tabulated below in Table D6.

Table D6. Nontarget Insect Acute Contact and Foliage Contact Toxicity

Species	% ai	(ng ai/bee)	Toxicity Category*	MRID No. Author/Year	Study Classification
Honey bee *(Apis mellifera)*	95.9	LD_{50} = 3.5 ng ai/bee [1] NOAEL (contact) = 0.8 ng ai/bee	Highly Toxic	42851530 (Hoxter, 1993)	Acceptable

*Toxicity Category for Honeybees via Contact Route: <2 µg/bee = highly toxic; 2 – 10.99 µg/bee = moderately toxic; > 11 µg/bee = practically non-toxic.

[1] Honeybee 95% Confidence Intervals = 0.6 – 17 ng ai/bee, Probit slope (95% C.I.) = 2.6 (0.3 – 4.8).

Emamectin benzoate residues on foliage sprayed at 0.015 lbs ai/acre remain lethal to honeybees for 8 to 24 hours post-application (Palmer, 1994; MRID 43393006).

The results of these studies indicate that emamectin benzoate is highly toxic to bees on an acute contact basis and foliar residues remain lethal for 8 to 24 hours post-application. These guidelines (OPPTS 850.3020 and 850.3030) are fulfilled (MRIDs 42851530 and 43393006).

vi. Terrestrial Field Testing

No terrestrial field studies were submitted and none is required.

B. Toxicity to Freshwater Aquatic Animals

i. Freshwater Fish, Acute

Two freshwater fish toxicity studies using the TGAI are required to establish the toxicity of emamectin benzoate to fish. The preferred test species are rainbow trout (a coldwater fish) and bluegill sunfish (a warmwater fish). Results of these tests are tabulated in Table D7 below.

Table D7. Freshwater Fish Acute Toxicity

Species/ Flow-through	% ai	96-hour LC_{50} (µg ai/L)	Toxicity Category	MRID No. Author/Year	Study Classification
Rainbow trout *(Oncorhynchus mykiss)*	95.9	174 [A]	highly toxic	42851529 (Holmes, Martin & Swigert, 1993)	Acceptable
Bluegill sunfish *(Lepomis macrochirus)*	95.9	180 [B]	highly toxic	42743602 (Holmes & Swigert, 1993)	Supplemental [1]
Fathead minnow *(Pimephales promelas)*	94.6	194 [C]	highly toxic	43850106 (Drottar, 1995)	Supplemental [2]

*Toxicity Category for Aquatic Animals: <0.1 mg/L = very highly toxic; 0.1 - 1 mg/L = highly toxic; 1 – 10 mg/L =

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Table D7. Freshwater Fish Acute Toxicity					
Species/ Flow-through	% ai	96-hour LC_{50} (µg ai/L)	Toxicity Category	MRID No. Author/Year	Study Classification

moderately toxic; 10 – 100 mg/L = slightly toxic; >100 mg/L = practically non-toxic.

[A] Trout 95% Confidence Intervals = 146 – 207 µg ai/L, Probit slope (95% C.I.) = 7.0 (3.6-10.3).

[B] Sunfish 95% Confidence Intervals = 140 – 240 µg ai/L, Probit slope (95% C.I.) = N/A (binomial test).

[C] Minnow 95% Confidence Intervals = 157 – 257 µg ai/L, Probit slope (95% C.I.) = N/A (binomial test).

[1] test material concentrations fluctuated excessively during the study and did not permit an accurate measure of toxicity.

[2] suspended particulates were not removed prior to extraction and chemical analyses.

Emamectin benzoate is categorized as highly toxic to freshwater fish on an acute basis. The guideline (OPPTS 850.1075) is fulfilled for rainbow trout (MRID 42851529) but not for bluegill sunfish (MRID 42743602).

ii. Freshwater Fish, Chronic

A freshwater fish early life-stage test using the TGAI is required for emamectin benzoate because the product is expected to be transported to water from the intended use site, and aquatic acute LC_{50} values are less than 1 mg/L. The preferred test species is rainbow trout. Results of this test are tabulated below in Table D8.

Table D8. Freshwater Fish Early Life-Stage Toxicity Under Flow-through Conditions					
Species/ Study Duration	% ai	NOAEC/LOAEC (µg ai/L)	Endpoints Affected	MRID No. Author/Year	Study Classification
Fathead minnow (*Pimephales promelas)* Flow-through	94.6%	6.5/12	3% inc. Embryo survival 4.5% inc percent hatched 74% red. Larvae survival 9% red. Total length 27% red. Wet wt. 26% red. Dry wt. 21% red. Biomass	43850107 (Drottar,1995)	Acceptable

Inc. = increase
Red. = reduction
Wt. = weight

The data suggest that emamectin benzoate affects larvae survival and fish growth at concentrations between 6.5 and 12 µg ai/L. The guideline (OPPTS 850.1400) is fulfilled (MRID 43850107).

iii. Freshwater Invertebrates, Acute

A freshwater aquatic invertebrate toxicity test using the TGAI is required to establish the toxicity of emamectin benzoate to aquatic invertebrates. The preferred test species is *Daphnia magna*. Results of this test are tabulated below in Table D9.

Table D9. Freshwater Invertebrate Acute Toxicity

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Table D9. Freshwater Invertebrate Acute Toxicity					
Species/Duration	**% ai**	**48-hour EC_{50} (µg ai/L)**	**Toxicity Category**	**MRID No. Author/Year**	**Study Classification**
Water flea *(Daphnia magna)* Flow-through	95.9%	1.0 [A]	Very highly toxic	42743603 (Holmes & Swigert 1993)	Acceptable

[A] Daphnid 95% Confidence Intervals = 0.84 – 1.19 µg ai/L, Probit slope (95% C.I.) = 4.7 (3.2-6.2).

Emamectin benzoate is categorized as very highly toxic to aquatic invertebrates (EC_{50} <0.1 mg/L), on an acute basis. The guideline (OPPTS 850.1010) is fulfilled (MRID 42743603).

iv. Freshwater Invertebrate, Chronic

A freshwater aquatic invertebrate life-cycle test using the TGAI is required for emamectin benzoate because the product is expected to be transported to water from the intended use site, and the aquatic acute EC_{50} value is less than 1 mg/L and the EEC in water is equal to or greater than 0.01 of the acute EC_{50} value. The preferred test species is *Daphnia magna*. Results of this test are tabulated below in Table D10.

Table D10. Freshwater Aquatic Invertebrate Life-Cycle Toxicity					
Species/ Duration	**% ai**	**21-day NOAEC/ LOAEC (µg ai/L)**	**Endpoints Affected**	**MRID No. Author/Year**	**Study Classification**
Waterflea *(Daphnia magna)* Flow-through	97.5	0.088/0.16	-egg production -young survival -growth	43393004 (Drottar, 1994)	Acceptable

The data suggest that emamectin benzoate reduces egg production, young survival and growth at concentrations between 0.088 and 0.16 µg/L. The guideline (OPPTS 850.1350) is fulfilled (MRID 43393004).

v. Freshwater Field Studies

Freshwater field studies are not required.

C. Toxicity to Estuarine and Marine Animals

i. Estuarine and Marine Fish, Acute

Acute toxicity testing with estuarine/marine fish using the TGAI is required for emamectin benzoate because the product is expected to reach this environment due to use of its use in coastal counties. The preferred test species is sheepshead minnow. Results of these tests are tabulated below in Table D11.

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Table D11. Estuarine/Marine Fish Acute Toxicity					
Species/Duration	**% ai**	**96-hour LC_{50} (µg ai/L)**	**Toxicity Category**	**MRID No. Author/Year**	**Study Classification**
Sheepshead minnow *(Cyprinodon variegatus)* Flow-through	95.9	1,430[A]	Moderately toxic	43393003 (Martin, 1994) 44007914 (Martin, 1995 revised)	Acceptable

[A] Minnow 95% Confidence Intervals = 1250 – 1670 µg ai/L, Probit slope (95% C.I.) = 7.9 (4.6 - 11).

Since the LC_{50} falls in the range of 1 to 10 mg/L, emamectin benzoate is categorized as moderately toxic to estuarine and marine fish on an acute basis. The guideline (OPPTS 850.1075) is fulfilled (MRID 43393003).

ii. Estuarine and Marine Fish, Chronic

An estuarine/marine fish early life-stage and life-cycle toxicity tests is not required for emamectin benzoate because the aquatic acute LC_{50} value is greater than 1 mg/L, and the EEC in water is less than 0.01 of the acute LC_{50} value. In addition, the fish acute toxicity values indicate that the freshwater fish species are more sensitive (approximately 10x) than the estuarine species. Furthermore, the risk quotients for fish, acute and chronic, are very low.

iii. Estuarine and Marine Invertebrates, Acute

Acute toxicity testing with estuarine/marine invertebrates using the TGAI is required for emamectin benzoate because the active ingredient is expected to reach this environment due to use in coastal counties. The preferred test species are mysid shrimp and eastern oyster. Results of these tests are tabulated below in Table D12.

Table D12. Estuarine/Marine Invertebrate Acute Toxicity					
Species/Duration	**% ai.**	**96-hour LC_{50}/EC_{50} (µg ai/L)**	**Toxicity Category**	**MRID No. Author/Year**	**Study Classification**
Eastern oyster *(Crassostrea virginica)* (shell deposition) Flow-through	95.9	EC_{50} = 490 [A]	Highly toxic	43393002 (Martin, 1994)	Acceptable
Mysid *(Americamysis bahia)* Flow-through	95.9	LC_{50} = 0.04 [B]	Very highly toxic	43393001 (Martin, 1994)	Acceptable

[A] Oyster 95% Confidence Intervals = 410 – 590 µg ai/L, Probit slope (95% C.I.) = 4.9 (C.I. not reported).
[B] Mysid 95% Confidence Intervals = 0.035 – 0.046 µg ai/kg bw, Probit slope (95% C.I.) = 8.1 (4.9 – 11.2).

Since the LC_{50} is <0.1 -1 mg/L, emamectin benzoate is categorized as very highly toxic to estuarine/marine invertebrates on an acute basis. The guidelines (OPPTS 850.1025 and 850.1035) are fulfilled (MRIDs 43393002 and 43393001).

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iv. Estuarine and Marine Invertebrate, Chronic

An estuarine/marine invertebrate life-cycle toxicity test using the TGAI is required for emamectin benzoate because the product is expected to be transported to this environment from the intended use site, and aquatic acute LC_{50} or EC_{50} values are less than 1 mg/L, and the EEC in water is equal to or greater than 0.01 of any acute LC_{50} or EC_{50} value. The preferred test species is mysid shrimp. Results of this test are tabulated below in Table D13.

Table D13. Estuarine/Marine Invertebrate Life-Cycle Toxicity

Species (Flow-through)	% ai	21-day NOAEC/LOAEC (µg ai/L)	Endpoints Affected	MRID No. Author/Year	Study Classification
Mysid *(Americamysis bahia)* Flow-through	95.2	NOAEC = 0.018 LOAEC = 0.028	Adult Survival Young/Female Male Adult Length Female Adult Length Male Dry Wt. Female Dry Wt.	44305601 (Boeri, R.L. et. al, 1997)	Supplemental[1]
	96.1	NOAEC = 0.0087 LOAEC = 0.013	Juvenile Survival Adult Survival Young/Female Length Dry Weight	45833001 (Blankinship, A.S., T.Z. Kendall, and H.O. Kruegar, 2002)	Supplemental[1]

[1] Highly erratic test concentrations were observed throughout the study. Measurements were made of dissolved and sorbed material; thus, true dissolved concentrations and toxicity parameters may be lower than reported.

Wt. = weight

The studies indicate that the LOAEC for emamectin benzoate is at least 0.013 µg/L. This guideline (OPPTS 850.1350) is not fulfilled (MRIDs 44305601 and 45833001).

v. Estuarine and Marine Field Studies

Estuarine and marine field studies are not required.

D. Toxicity to Terrestrial Plants

Terrestrial plant testing (seedling emergence and vegetative vigor) is required for any pesticides that have terrestrial outdoor use patterns and that may move off the application site through volatilization (vapor pressure $>1.0 \times 10^{-5}$mm Hg at 25°C) or drift (aerial or irrigation) and/or that may have endangered or threatened plant species associated with the application site. For seedling emergence and vegetative vigor testing, the following plant species and groups should be tested: (1) six species of at least four dicotyledonous families, one species of which is soybean (*Glycine max*) and the second is a root crop, and (2) four species of at least two monocotyledonous families, one of which is corn (*Zea mays*). Tier I tests measure the response of plants, relative to a control, at a test level that is equal to the highest use rate (expressed as lbs ai/A).

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i. Seedling Emergence, Tier I

A seedling emergence toxicity test (OPPTS 850.4100) for emamectin benzoate is not available.

ii. Vegetative Vigor, Tier I

A vegetative vigor toxicity test (OPPTS 850.4150) for emamectin benzoate is not available.

E. Toxicity to Aquatic Plants

Aquatic plant testing is required for any pesticides that has terrestrial outdoor use patterns and that may move off-site by runoff (solubility >10 mg/L in water), and/or by drift (aerial or irrigation) or that is applied directly to aquatic use sites (except residential). The following species should be tested at Tier I: *Selenastrum capricornutum* and *Lemna gibba*. Results are tabulated below in Table D14.

Table D14. Nontarget Aquatic Plant Toxicity (Tier I)

Species / Duration	% ai	Dose (µg ai/L)	% Response	MRID No. Author/Year	Study Classification
Vascular Plant- Duckweed *(Lemna gibba)* Static	94.6	94 (initial measured)	<2	43850109 Thompson & Swigert (1995)	Acceptable
Freshwater algae *(Selenastrum capricornutum)* Static	94.6	3.9 (initial measured)	13	43850108 Cynthia, R.A. (1995)	Acceptable

The guideline (OPPTS 850.4400 and 850.5400) is fulfilled (MRID 43850109 and 43850108), as specified above.

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Appendix E. Direct Effects Endangered Species Analysis for Almond, Filbert, Macadamia Nut, Pecan, Pistachio, English Walnut and other Nuts

Species in Counties by State and Taxa

No species were excluded

Minimum of 10 Acre

All Medium Types Reported

Mammal, Bird, Amphibian, Reptile, Crustacean, Bivalve, Gastropod, Arachnid, Insect, Dicot, Monocot, Ferns, Conf/cycds

almonds, hazelnuts (filberts), macadamia nuts, nuts - other, pistachios, walnuts, english, pecans

AL, AK, AZ, AR, CA, CO, CT, DE, DC, FL, GA, HI, ID, IL, IN, IA, KS, KY, LA, ME, MD, MA, MI, MN, MS, MO, MT, NE, NV, NH, NJ, NM, NY, NC, ND, OH, OK, OR, PA, PR, RI, SC, SD, TN, TX, UT, VT, VA, WA, WV, WI, WY

Alabama

Amphibian

Salamander, Flatwoods
Ambystoma cingulatum

Baldwin
Covington
Houston
Mobile

Salamander, Red Hills
Phaeognathus hubrichti

Butler
Conecuh
Covington
Crenshaw
Monroe

Bird

Plover, Piping
Charadrius melodus

Baldwin
Mobile

Stork, Wood
Mycteria americana

Autauga

Barbour
Choctaw
Clarke
Colbert
Dallas
Escambia
Lowndes
Montgomery
Washington
Wilcox

Bird

Woodpecker, Red-cockaded
Picoides borealis

Baldwin

Bibb
Calhoun
Cleburne
Conecuh
Covington
Dallas

Escambia
Geneva
Lawrence
Macon
Marshall
Perry
Pickens
Russell
Talladega
Tallapoosa
Tuscaloosa
Winston

Bivalve

Combshell, Southern (=Penitent mussel)
Epioblasma penita

Lamar

Combshell, Upland
Epioblasma metastriata

Cherokee
Jefferson
St. Clair

Kidneyshell, Triangular
Ptychobranchus greenii

Bivalve

Cherokee
Cullman
Jefferson

Lawrence
St. Clair
Walker
Winston

Mucket, Orangenacre
Lampsilis perovalis

Bibb
Fayette
Greene
Jefferson
Lamar
Lawrence
Pickens
Shelby
Winston

Mucket, Pink (Pearlymussel)
Lampsilis abrupta

Colbert
Jackson
Lauderdale
Lauderdale
Lawrence
Madison
Marshall
Morgan

Mussel, Acornshell Southern
Epioblasma othcaloogensis

Cherokee
Shelby
St. Clair

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Bivalve

Mussel, Alabama Moccasinshell
Medionidus acutissimus
Cherokee
Greene
Lamar
Lawrence
Pickens
Shelby
Winston

Mussel, Coosa Moccasinshell
Medionidus parvulus
Cherokee

Talladega
Winston
Mussel, Cumberland Combshell
Epioblasma brevidens

Colbert
Mussel, Dark Pigtoe
Pleurobema furvum

Fayette

Lawrence
Tuscaloosa
Winston
Mussel, Fine-lined Pocketbook
Lampsilis altilis

Bibb
Calhoun
Cherokee
Clay
Cleburne
Cullman

Dallas
De Kalb
Elmore
Fayette
Jefferson
Lawrence
Lee
Macon
Shelby
St. Clair
Talladega
Tallapoosa
Tuscaloosa

Bivalve

Walker
Winston
Mussel, Fine-rayed Pigtoe
Fusconaia cuneolus
Jackson
Madison
Marshall
Mussel, Flat Pigtoe (=Marshall's Mussel)
Pleurobema marshalli

Greene
Mussel, Heavy Pigtoe (=Judge Tait's Mussel)
Pleurobema taitianum
Baldwin
Clarke

Dallas
Greene
Monroe

Pickens

Mussel, Heelsplitter Inflated
Potamilus inflatus
Baldwin
Bibb
Choctaw

Clarke
Greene
Marengo
Sumter
Tuscaloosa
Washington

Mussel, Ovate Clubshell
Pleurobema perovatum
Cullman
Fayette
Greene
Lamar
Lee
Macon
Pickens
St. Clair
Sumter
Tuscaloosa
Walker

Bivalve

Mussel, Ring Pink (=Golf Stick
Obovaria retusa
Colbert
Lauderdale
Mussel, Rough Pigtoe
Pleurobema plenum
Colbert
Lauderdale
Lawrence
Madison
Madison
Marshall
Morgan

Mussel, Shiny Pigtoe
Fusconaia cor
Jackson
Madison
Madison
Marshall
Mussel, Shiny-rayed Pocketbook
Lampsilis subangulata
Lampsilis subangulata
Russell

Mussel, Southern Clubshell
Pleurobema decisum
Bibb
Cherokee
Dallas
Dallas
Fayette
Greene
Lamar
Macon
Marion
Perry

Pickens
Tuscaloosa
Mussel, Southern Pigtoe
Pleurobema georgianum
Calhoun
Cherokee
Cleburne
St. Clair
Pearlymussel, Alabama Lamp
Lampsilis virescens
Jackson
Pearlymussel, Cracking
Hemistena lata

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Bivalve

Lauderdale
Pearlymussel, Orange-footed
Plethobasus cooperianus
Madison
Marshall
Morgan
Pearlymussel, Pale Lilliput

Toxolasma cylindrellus
Jackson
Pearlymussel, Turgid-blossom
Epioblasma turgidula
Lauderdale
Pearlymussel, White Wartyback
Plethobasus cicatricosus
Colbert
Lauderdale
Stirrupshell
Quadrula stapes
Greene
Pickens
Sumter

Crustacean

Shrimp, Alabama Cave
Palaemonias alabamae
Madison

Dicot

Amphianthus, Little

Amphianthus pusillus
Chambers

Barbara Buttons, Mohr's

Marshallia mohrii

Bibb

Calhoun
Cherokee
Bladderpod, Lyrate
Lesquerella lyrata
Colbert
Franklin
Lawrence

Clover, Leafy Prairie
Dalea foliosa

Franklin
Jefferson

Dicot

Lawrence
Morgan

Harperella
Ptilimnium nodosum
Cherokee
Cullman
De Kalb

Jackson
Lee
Walker
Leather-flower, Alabama
Clematis socialis
Cherokee
St. Clair
Leather-flower, Morefield's
Clematis morefieldii
Madison
Pitcher-plant, Alabama Canebrake
Sarracenia rubra alabamensis
Autauga
Chilton
Elmore
Pitcher-plant, Green
Sarracenia oreophila
Cherokee
De Kalb
Jackson

Marshall

Potato-bean, Price's
Apios priceana

Autauga

Madison

Marshall

Ferns

Fern, Alabama Streak-sorus
Thelypteris pilosa var. alabamensis
Winston
Fern, American hart's-tongue
Asplenium scolopendrium var. americanum
Jackson

Morgan

Quillwort, Louisiana
Isoetes louisianensis

Ferns

Mobile
Washington

Gastropod

Elimia, Lacy
Elimia crenatella
Talladega

Pebblesnail, Flat
Lepyrium showalteri
Bibb
Shelby
Riversnail, Anthony's
Athearnia anthonyi
Jackson
Rocksnail, Painted
Leptoxis taeniata
Calhoun
Chilton
Shelby
Talladega
Rocksnail, Plicate
Leptoxis plicata
Jefferson
Rocksnail, Round
Leptoxis ampla
Bibb
Shelby
Snail, Lioplax Cylindrical
Snail, Lioplax Cylindrical
Lioplax cyclostomaformis
Lioplax cyclostomaformis
Bibb
Shelby
Shelby
Snail, Tulotoma
Snail, Tulotoma
Tulotoma magnifica
Tulotoma magnifica
Calhoun
Calhoun
Elmore
Shelby
St. Clair
Talladega

Mammal

Bat, Gray
Bat, Gray
Myotis grisescens
Calhoun

Colbert
Conecuh

De Kalb

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Mammal

Jackson
Lauderdale
Lawrence
Madison
Marshall
Morgan
Shelby

Bat, Indiana
Myotis sodalis
Autauga
Colbert
De Kalb
Jackson
Lawrence
Marshall
Morgan
Shelby

Mouse, Alabama Beach
Peromyscus polionotus ammobates
Baldwin

Mouse, Perdido Key Beach
Peromyscus polionotus trissyllepsis
Baldwin

Monocot

Grass, Tennessee Yellow-eyed
Xyris tennesseensis
Bibb
Calhoun
Franklin

Trillium, Relict
Trillium reliquum
Bullock
Henry
Lee

Water-plantain, Kral's
Sagittaria secundifolia
De Kalb
Winston

Reptile

Sea turtle, loggerhead
Caretta caretta
Baldwin
Mobile

Reptile

Snake, Eastern Indigo
Drymarchon corais couperi
Baldwin
Bullock
Conecuh
Covington
Escambia
Geneva
Mobile
Washington

Tortoise, Gopher
Gopherus polyphemus
Choctaw
Mobile
Sumter
Washington

Turtle, Alabama Red-bellied
Pseudemys alabamensis
Baldwin
Mobile

Turtle, Flattened Musk
Sternotherus depressus
Cullman
Jefferson
Marshall
Tuscaloosa
Walker
Winston

Arizona

Amphibian

Frog, Chiricahua Leopard
Rana chiricahuensis
Cochise
Gila
Graham
Greenlee
Pima
Yavapai

Salamander, Sonora Tiger
Ambystoma tigrinum stebbinsi
Cochise

Bird

Bobwhite, Masked
Colinus virginianus ridgwayi
Pima

Condor, California
Gymnogyps californianus
Mohave

Falcon, Northern Aplomado
Falco femoralis septentrionalis
Cochise

Flycatcher, Southwestern Willow
Empidonax traillii extimus
Cochise
Gila
Graham
Greenlee
Maricopa
Mohave
Pima
Pinal
Yavapai
Yuma

Owl, Mexican Spotted
Strix occidentalis lucida
Cochise
Gila
Graham
Greenlee
Maricopa
Mohave
Pima
Pinal
Yavapai

Pygmy-owl, Cactus Ferruginous
Glaucidium brasilianum cactorum
Cochise
Cochise
Gila
Graham
Graham
Greenlee
Greenlee
Maricopa
Maricopa
Pima
Pinal
Pinal
Yuma

Rail, Yuma Clapper
Rail, Yuma Clapper
Rallus longirostris yumanensis

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Bird

Gila
Maricopa
Mohave
Pinal
Yuma

Dicot

Blue-star, Kearney's
Amsonia kearneyana
Pima

Cactus, Arizona Hedgehog
Echinocereus triglochidiatus var. arizonicus

Gila

Maricopa

Pinal

Cactus, Cochise Pincushion
Coryphantha robbinsorum

Cochise

Cactus, Nichol's Turk's Head
Echinocactus horizonthalonius var. nicholii
Pima
Pinal

Cactus, Pima Pineapple
Coryphantha scheeri var.
Pima

Cactus, Siler Pincushion
Pediocactus
(=Echinocactus,=Utahia) sileri
Mohave

Cliffrose, Arizona
Purshia (=cowania) subintegra
Graham
Maricopa
Mohave
Yavapai

Cycladenia, Jones
Cycladenia jonesii (=humilis)
Mohave

Milk-vetch, Holmgren
Astragalus holmgreniorum
Mohave

Umbel, Huachuca Water
Lilaeopsis schaffneriana var. recurva
Cochise

Dicot

Pima

Gastropod

Ambersnail, Kanab
Oxyloma haydeni kanabensis
Mohave

Mammal

Bat, Lesser (=Sanborn's) Long-
Leptonycteris curasoae
Cochise
Gila
Graham

Greenlee

Maricopa

Pima

Pinal
Yavapai

Yuma

Jaguar
Panthera onca

Cochise
Graham
Greenlee
Pima
Pinal

Jaguarundi, Sinaloan
Herpailurus (=Felis) yagouaroundi tolteca

Cochise
Graham

Ocelot
Leopardus (=Felis) pardalis
Cochise
Graham
Pima

Pronghorn, Sonoran
Antilocapra americana sonoriensis

Maricopa
Pima
Yuma

Squirrel, Mount Graham Red
Tamiasciurus hudsonicus
Graham

Vole, Hualapai Mexican
Microtus mexicanus hualpaiensis

Mammal

Mohave

Wolf, Gray
Canis lupus
Cochise
Pima

Monocot

Ladies'-tresses, Canelo Hills
Spiranthes delitescens
Cochise

Reptile

Rattlesnake, New Mexican Ridge-
Rattlesnake, New Mexican Ridge-
Crotalus willardi obscurus

Cochise

Tortoise, Desert
Tortoise, Desert
Gopherus agassizii
Mohave

Arkansas
Arkansas

Bird

Tern, Interior (population) Least
Sterna antillarum
Arkansas
Chicot
Conway
Crawford
Crittenden
Desha
Desha
Faulkner
Franklin
Jefferson
Johnson
Lee
Lincoln
Logan
Lonoke
Mississippi
Mississippi
Perry
Phillips
Pope
Pope
Pulaski
Sebastian
St. Francis
St. Francis
Yell

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Bird

Woodpecker, Red-cockaded
Picoides borealis
Ashley
Jefferson
Lafayette
Perry
Pulaski
Saline
Yell

Bivalve

Fatmucket, Arkansas
Lampsilis powelli

Montgomery

Saline
Mucket, Pink (Pearlymussel)
Lampsilis abrupta

Arkansas

Clay
Desha
Hot Spring

Independence

Jackson

Lawrence
Ouachita
Prairie

Sevier
White

Woodruff

Mussel, Scaleshell
Leptodea leptodon

Cross

Howard
Lawrence

Lee

Perry
Saline
Sevier

Sharp
St. Francis

Mussel, Speckled Pocketbook

Bivalve

Arkansas
Craighead
Cross
Desha
Lee
Mississippi
Phillips
Poinsett
Prairie
St. Francis
White

Woodruff

Rock-pocketbook, Ouachita
(=Wheeler's pm)
Arkansia wheeleri
Little River

Sevier

Crustacean

Crayfish, Cave (Cambarus
Cambarus aculabrum

Benton

Crayfish, Cave (Cambarus
zophonastes)
Cambarus zophonastes
Stone

Dicot

Bladderpod, Missouri
Lesquerella filiformis

Izard

Washington

Fruit, Earth (=geocarpon)
Geocarpon minimum

Franklin

Harperella
Ptilimnium nodosum

Montgomery
Yell

Pondberry
Lindera melissifolia
Clay

Gastropod

Shagreen, Magazine Mountain
Mesodon magazinensis
Logan

Insect

Beetle, American Burying
Nicrophorus americanus
Franklin
Logan
Sebastian

Mammal

Bat, Gray
Bat, Gray
Myotis grisescens
Baxter
Baxter
Benton
Boone
Carroll
Carroll
Independence
Independence
Izard
Lawrence

Madison

Marion
Newton
Newton
Pope
Sharp
Stone
Stone
Washington

Bat, Indiana
Myotis sodalis

Izard
Izard
Newton

Stone
Bat, Ozark Big-eared
Bat, Ozark Big-eared
Corynorhinus (=Plecotus)
townsendii ingens
Marion
Marion
Washington

California

Amphibian

Frog, California Red-legged
Frog, California Red-legged

Lampsilis streckeri
Stone

Pearlymussel, Fat Pocketbook
Potamilus capax

Jackson
Lawrence
Woodruff

Gastropod

Rana aurora draytonii
Alameda
Butte

Calaveras

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Amphibian

Contra Costa
El Dorado
Kern
Los Angeles
Marin
Merced
Monterey
Napa
Nevada
San Benito
San Luis Obispo
San Mateo
Santa Barbara
Santa Clara
Santa Cruz
Shasta
Solano
Ventura
Yuba

Frog, Mountain Yellow-legged
Gopherus agassizii
Los Angeles
Riverside
San Bernardino

Salamander, California Tiger
Ambystoma californiense
Alameda
Contra Costa
Fresno
Kern
Kings
Madera
Merced
Monterey
Sacramento
San Bernardino
San Joaquin
San Luis Obispo
San Mateo

Santa Barbara
Santa Clara
Santa Cruz
Solano
Sonoma

Amphibian

Stanislaus
Tulare
Yolo

Salamander, Desert Slender
Batrachoseps aridus
Riverside

Salamander, Santa Cruz Long-toed
Ambystoma macrodactylum
Monterey
Santa Cruz

Toad, Arroyo Southwestern
Bufo californicus (=microscaphus)
Imperial
Los Angeles
Monterey
Riverside
San Bernardino
San Diego

Santa Barbara
Ventura

Bird

Condor, California
Gymnogyps californianus
Kern

Los Angeles
Monterey
San Luis Obispo
Santa Barbara
Tulare
Ventura

Flycatcher, Southwestern Willow
Empidonax traillii extimus
Kern
Los Angeles
Riverside
San Bernardino
San Diego
Santa Barbara

Gnatcatcher, Coastal California
Polioptila californica californica
Los Angeles
Riverside
San Bernardino
San Diego

Bird

Ventura

Murrelet, Marbled
Brachyramphus marmoratus marmoratus
Glenn
Humboldt
Lake
Los Angeles
Marin
Mendocino
Monterey
San Diego
San Luis Obispo
San Mateo
Santa Barbara
Santa Cruz
Siskiyou
Sonoma

Owl, Northern Spotted
Strix occidentalis caurina
Colusa
Glenn
Humboldt
Lake
Marin

Mendocino
Napa
Shasta
Siskiyou
Sonoma
Tehama
Trinity

Pelican, Brown
Pelecanus occidentalis
Alameda
Contra Costa
Humboldt
Imperial
Los Angeles
Marin
Marin
Mendocino
Monterey
Napa
Riverside

US EPA ARCHIVE DOCUMENT

Bird

San Diego
San Luis Obispo
San Mateo
Santa Barbara
Santa Clara
Santa Cruz
Solano
Sonoma
Ventura
Yuba

Plover, Western Snowy
Charadrius alexandrinus nivosus

Alameda
Humboldt
Los Angeles
Marin
Mendocino
Monterey
Napa
San Diego
San Luis Obispo
San Mateo
Santa Barbara
Santa Clara
Santa Cruz
Sonoma
Ventura

Rail, California Clapper
Rallus longirostris obsoletus

Alameda
Contra Costa
Marin
Monterey
Napa
San Luis Obispo
San Mateo
Santa Clara
Solano
Sonoma

Rail, Light-footed Clapper
Rallus longirostris levipes

Los Angeles
San Diego
Santa Barbara

Bird

Ventura

Rail, Yuma Clapper
Rallus longirostris yumanensis

Imperial
Riverside
San Bernardino

Shrike, San Clemente Loggerhead
Lanius ludovicianus mearnsi

Los Angeles

Sparrow, San Clemente Sage
Amphispiza belli clementeae

Los Angeles

Tern, California Least
Sterna antillarum browni

Alameda
Contra Costa
Los Angeles
Monterey
San Diego
San Luis Obispo
San Mateo
Santa Barbara
Santa Clara
Ventura

Towhee, Inyo Brown
Pipilo crissalis eremophilus

Inyo

Vireo, Least Bell's
Vireo bellii pusillus

Inyo
Kern
Los Angeles
Monterey
Riverside
San Bernardino
San Diego
San Luis Obispo
Santa Barbara
Ventura

Conf/cycds

Cypress, Gowen
Cupressus goveniana ssp.

Monterey

Conf/cycds

Cypress, Santa Cruz
Cupressus abramsiana

San Mateo
Santa Cruz

Crustacean

Abalone, White
Haliotis sorenseni

Los Angeles
San Diego
Santa Barbara
Ventura

Crayfish, Shasta
Pacifastacus fortis

Shasta

Fairy Shrimp, Conservancy Fairy
Branchinecta conservatio

Butte
Glenn
Merced
Solano
Tehama
Ventura

Fairy Shrimp, Longhorn
Branchinecta longiantenna

Alameda
Contra Costa
Kern
Monterey
San Luis Obispo

Fairy Shrimp, Riverside
Streptocephalus woottoni

Los Angeles
Riverside
San Diego
Ventura

Fairy Shrimp, San Diego
Branchinecta sandiegonensis

San Diego

Fairy Shrimp, Vernal Pool
Branchinecta lynchi

Alameda
Amador
Butte
Colusa

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Crustacean

Contra Costa
Fresno
Glenn
Kings
Madera
Mariposa
Merced
Monterey
Napa
Placer
Riverside
Sacramento
San Benito
San Joaquin
San Luis Obispo
Santa Barbara
Shasta
Solano
Stanislaus
Tehama
Tulare
Ventura
ssp. compactum
Yuba

Shrimp, California Freshwater
Syncaris pacifica
Marin

Napa
Sonoma
Tadpole Shrimp, Vernal Pool
vineum
Lepidurus packardi
Alameda
Amador
prostratum)
Butte

Calaveras
Colusa

El Dorado

Fresno
Glenn
Island
Kings

Madera
Mariposa
Merced
Placer
Sacramento

Crustacean

San Joaquin
Shasta
Solano
Stanislaus
Sutter
Tehama
Tulare
Yolo
Yuba

Dicot

Adobe Sunburst, San Joaquin
Pseudobahia peirsonii
Fresno
Madera
Stanislaus
Allocarya, Calistoga
Plagiobothrys strictus
Napa
Ambrosia, San Diego
Ambrosia pumila
Riverside
San Diego

Baccharis, Encinitas
Baccharis vanessae
San Diego

Barberry, Island
Berberis pinnata ssp. insularis
Santa Barbara
Barberry, Nevin's

Berberis nevinii
Los Angeles
Riverside

Bedstraw, El Dorado
Galium californicum ssp. sierrae
El Dorado

Bedstraw, Island
Galium buxifolium
Santa Barbara

Bird's-beak, Palmate-bracted
Cordylanthus palmatus
Alameda
Colusa
Fresno
Madera

Dicot

San Joaquin
Yolo
Bird's-beak, Pennell's
Cordylanthus tenuis ssp. capillaris
Sonoma
Bird's-beak, salt marsh
Cordylanthus maritimus ssp.
Los Angeles
San Diego
San Luis Obispo
Santa Barbara
Ventura
Bird's-beak, Soft
Cordylanthus mollis ssp. mollis
Contra Costa
Napa
Solano
Bladderpod, San Bernardino
Lesquerella kingii ssp. bernardina
San Bernardino
Bluecurls, Hidden Lake
Trichostema austromontanum

compactum

San Bernardino
Broom, San Clemente Island
Lotus dendroideus ssp. traskiae

Los Angeles
Buckwheat, Cushenbury
Eriogonum ovalifolium var.

San Bernardino
Buckwheat, Ione (incl. Irish Hill)
Eriogonum apricum (incl. var.

Amador

Buckwheat, Southern Mountain
Eriogonum kennedyi var.
austromontanum
austromontanum
San Bernardino
Bush-mallow, San Clemente

Malacothamnus clementinus
Malacothamnus clementinus
Los Angeles
Bush-mallow, Santa Cruz Island
Malacothamnus fasciculatus var.
nesioticus
Santa Barbara

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Butterweed, Layne's
Senecio layneae
El Dorado
Tuolumne

Button-celery, San Diego Mountains
Eryngium aristulatum var. parishii
Riverside
San Diego

Cactus, Bakersfield
Opuntia treleasei
Kern

Ceanothus, Coyote
Ceanothus ferrisae
Santa Clara

Ceanothus, Pine Hill
Ceanothus roderickii
El Dorado

Ceanothus, Vail Lake
Ceanothus ophiochilus
Riverside

Centaury, Spring-loving
Centaurium namophilum
Inyo

Checker-mallow, Keck's
Sidalcea keckii
Fresno
Tulare

Checker-mallow, Kenwood Marsh
Sidalcea oregana ssp. valida
Sonoma

Checker-mallow, Pedate
Sidalcea pedata
San Bernardino

Clarkia, Pismo
Clarkia speciosa ssp. immaculata ssp.
San Luis Obispo

Clarkia, Presidio
Clarkia franciscana
Alameda

Clarkia, Springville flowered
Clarkia springvillensis
Tulare

Clarkia, Vine Hill
Clarkia imbricata

Dicot

Sonoma

Clover, Fleshy Owl's
Castilleja campestris ssp. succulenta
Fresno
Madera
Mariposa
Merced
San Joaquin
Stanislaus
Tuolumne

Clover, Monterey
Trifolium trichocalyx
Monterey

Clover, Showy Indian
Trifolium amoenum
Marin
Sonoma

Coyote-thistle, Loch Lomond
Eryngium constancei
Lake

Crownbeard, Big-leaved
Verbesina dissita
San Diego

Crownscale, San Jacinto Valley
Atriplex coronata var. notatior
Riverside

Daisy, Parish's
Erigeron parishii
Riverside
San Bernardino

Dudleya, Conejo
Dudleya abramsii ssp. parva
Ventura

Dudleya, Marcescent
Dudleya cymosa ssp. marcescens
Los Angeles
Santa Barbara

Dudleya, Santa Clara Valley
Dudleya setchellii
Alameda
Contra Costa
Fresno
Monterey
San Benito

Dicot

Santa Clara

Dudleya, Santa Cruz Island
Dudleya nesiotica
Santa Barbara

Dudleya, Santa Monica
Dudleya cymosa ssp. ovatifolia
Los Angeles
Ventura

Dudleya, Verity's
Dudleya verityi
Ventura

Dwarf-flax, Marin
Hesperolinon congestum
Marin

Evening-primrose, Antioch Dunes
Oenothera deltoides ssp. howellii
Contra Costa
Sacramento

Evening-primrose, Eureka Valley
Oenothera avita ssp. eurekensis
Inyo

Evening-primrose, San Benito
Camissonia benitensis
San Benito

Fiddleneck, Large-flowered
Amsinckia grandiflora
Alameda
Contra Costa
San Joaquin

Flannelbush, Mexican
Fremontodendron mexicanum
San Diego

Flannelbush, Pine Hill
Fremontodendron californicum decumbens
El Dorado

Fringepod, Santa Cruz Island
Thysanocarpus conchuliferus
Santa Barbara

Gilia, Hoffmann's Slender-
Gilia tenuiflora ssp. hoffmannii
Santa Barbara

Gilia, Monterey
Gilia tenuiflora ssp. arenaria

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Dicot

Monterey

Golden Sunburst, Hartweg's
Pseudobahia bahiifolia
Fresno
Madera
Stanislaus

Goldfields, Burke's
Lasthenia burkei
Lake
Mendocino
Sonoma

Goldfields, Contra Costa
Lasthenia conjugens
Alameda
Contra Costa
Mendocino
Monterey
Napa
Santa Barbara
Santa Clara
Solano

Grass, Hairy Orcutt
Orcuttia pilosa
Butte
Colusa
Fresno
Glenn
Madera
Mariposa
Merced
Stanislaus
Tehama

Grass, Sacramento Orcutt
Orcuttia viscida
Amador
Sacramento

Grass, Slender Orcutt
Orcuttia tenuis
Butte
Lake
Sacramento
Shasta
Siskiyou
Tehama

Dicot

Gumplant, Ash Meadows
Grindelia fraxino-pratensis
Inyo

Ivesia, Ash Meadows
Ivesia kingii var. eremica
Inyo

Jewelflower, California
Caulanthus californicus
Fresno
Kern
Kings
San Luis Obispo
Santa Barbara
Tulare

Jewelflower, Tiburon
Streptanthus niger
Marin

Larkspur, Baker's
Delphinium bakeri
Marin
Sonoma

Larkspur, San Clemente Island
Delphinium variegatum ssp.
Los Angeles

Larkspur, Yellow
Delphinium luteum
Marin
Sonoma

Layia, Beach
Layia carnosa
Humboldt
Marin
Monterey
Santa Barbara

Lessingia, San Francisco
Lessingia germanorum (=L.g. var. germanorum)
San Mateo

Liveforever, Santa Barbara Island
Dudleya traskiae
Santa Barbara

Lupine, Clover
Lupinus tidestromii
Madera

Dicot

Marin
Monterey
Sonoma

Lupine, Nipomo Mesa
Lupinus nipomensis
San Luis Obispo

Malacothrix, Island
Malacothrix squalida
Santa Barbara

Malacothrix, Santa Cruz Island
Malacothrix indecora
Santa Barbara
Ventura

Mallow, Kern
Eremalche kernensis
Kern

Manzanita, Del Mar
Arctostaphylos glandulosa ssp. crassifolia
San Diego

Manzanita, Ione
Arctostaphylos myrtifolia
Amador
Calaveras

Manzanita, Morro
Arctostaphylos morroensis
San Luis Obispo

Manzanita, Pallid
Arctostaphylos pallida
Alameda
Contra Costa

Manzanita, Santa Rosa Island
Arctostaphylos confertiflora
Santa Barbara

Meadowfoam, Butte County
Limnanthes floccosa ssp.
Butte
Butte
Tehama

Meadowfoam, Sebastopol
Limnanthes vinculans
Sonoma

Milk-vetch, Braunton's
Astragalus brauntonii
Los Angeles

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Dicot

Ventura
Milk-vetch, Clara Hunt's
Astragalus clarianus
Napa
Sonoma
Milk-vetch, Coachella Valley
Astragalus lentiginosus var.
Riverside
Milk-vetch, Coastal Dunes
Astragalus tener var. titi
Monterey
Milk-vetch, Cushenbury

Astragalus albens
San Bernardino

Milk-vetch, Fish Slough
Astragalus lentiginosus var.
Inyo

Milk-vetch, Lane Mountain
Astragalus jaegerianus

San Bernardino
Milk-vetch, Pierson's
Astragalus magdalenae var.

Imperial

Milk-vetch, Triple-ribbed
Astragalus tricarinatus
Riverside
San Bernardino

Milk-vetch, Ventura Marsh
Astragalus pycnostachyus var.

lanosissimus

Santa Barbara
Ventura
Mint, Otay Mesa

Pogogyne nudiuscula

Riverside
San Diego
Mint, San Diego Mesa

Pogogyne abramsii
San Diego
Monardella, Willowy

Monardella linoides ssp. viminea
San Diego

Morning-glory, Stebbins
Calystegia stebbinsii

Dicot

El Dorado
Mountainbalm, Indian Knob
Eriodictyon altissimum
San Luis Obispo
Mountain-mahogany, Catalina
Cercocarpus traskiae
Los Angeles
Mustard, Slender-petaled
Thelypodium stenopetalum
San Bernardino
Navarretia, Few-flowered
Navarretia leucocephala ssp. pauciflora (=N. pauciflora)

Alameda
Contra Costa

Mendocino
Napa
Santa Barbara

Santa Clara

Solano
Navarretia, Many-flowered
Navarretia leucocephala ssp.

Alameda
Contra Costa

Mendocino
Napa
Santa Barbara

Santa Clara

Solano

Navarretia, Spreading

Navarretia fossalis
Los Angeles
Riverside

San Diego

Niterwort, Amargosa
Nitrophila mohavensis
Inyo

Oxytheca, Cushenbury
Oxytheca parishii var. goodmaniana
San Bernardino

Paintbrush, Ash-grey Indian
Castilleja cinerea

San Bernardino

Dicot

Paintbrush, San Clemente Island
Castilleja grisea
Los Angeles
Paintbrush, Soft-leaved
Castilleja mollis
Santa Barbara
Paintbrush, Tiburon
Castilleja affinis ssp. neglecta
Marin
Napa
Santa Clara
Penny-cress, Kneeland Prairie

Thlaspi californicum
Humboldt

Pentachaeta, Lyon's
Pentachaeta lyonii
Los Angeles
Ventura
Ventura

Pentachaeta, White-rayed
Pentachaeta bellidiflora
Marin

San Mateo
Santa Cruz

Phacelia, Island
Phacelia insularis ssp. insularis
Santa Barbara

Phlox, Yreka
Phlox hirsuta
Phlox hirsuta

Siskiyou

Polygonum, Scott's Valley
Polygonum hickmanii
Santa Cruz

Potentilla, Hickman's

Potentilla hickmanii
Monterey
San Mateo

Pussypaws, Mariposa
Calyptridium pulchellum
Fresno

Madera
Mariposa

Rock-cress, Hoffmann's
Arabis hoffmannii
Santa Barbara

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Dicot

Rock-cress, McDonald's
Arabis mcdonaldiana
Mendocino

Rock-cress, Santa Cruz Island
Sibara filifolia
Los Angeles

Rush-rose, Island
Helianthemum greenei
Los Angeles

Sandwort, Bear Valley
Arenaria ursina
San Bernardino

Sandwort, Marsh
Arenaria paludicola hydrophilum
San Luis Obispo

Sea-blite, California
Suaeda californica
San Luis Obispo

Spineflower, Ben Lomond
Chorizanthe pungens var. duttonii
Santa Cruz

Spineflower, Howell's
Chorizanthe howellii
Mendocino

Spineflower, Monterey
Chorizanthe pungens var. pungens
Monterey
Santa Cruz

Spineflower, Orcutt's
Chorizanthe orcuttiana
San Diego

Spineflower, Robust
Chorizanthe robusta var. robusta
Monterey
Santa Cruz

Spineflower, Scotts Valley
Chorizanthe robusta var. hartwegii
Santa Cruz

Spineflower, Slender-horned
Dodecahema leptoceras
Los Angeles
Riverside
San Bernardino
San Diego

Dicot

Spineflower, Sonoma
Chorizanthe valida
Marin
Sonoma

Spurge, Hoover's
Chamaesyce hooveri
Butte
Colusa
Glenn
Merced
Stanislaus
Tehama
Tulare
Tuolumne

Stickyseed, Baker's
Blennosperma bakeri
Sonoma

Stonecrop, Lake County
Parvisedum leiocarpum
Alameda
Contra Costa
Mendocino
Napa
Santa Barbara
Santa Clara
Solano

Sunflower, San Mateo Woolly
Eriophyllum latilobum
San Mateo

Taraxacum, California
Taraxacum californicum
San Bernardino

Tarplant, Gaviota
Deinandra increscens ssp. villosa
Santa Barbara

Tarplant, Otay
Deinandra (=Hemizonia) conjugens
San Diego

Tarplant, Santa Cruz
Holocarpha macradenia
Contra Costa
Monterey
Santa Cruz

Dicot

Thistle, Chorro creek Bog
Cirsium fontinale var. obispoense
San Luis Obispo

Thistle, Fountain
Cirsium fontinale var. fontinale
San Mateo
Santa Barbara
Santa Clara

Thistle, La Graciosa
Cirsium loncholepis
San Luis Obispo
Santa Barbara

Thistle, Suisun
Cirsium hydrophilum var.
Solano

Thornmint, San Diego
Acanthomintha ilicifolia
San Diego

Thornmint, San Mateo
Acanthomintha obovata ssp.
San Mateo

Tuctoria, Green's
Tuctoria greenei
Butte
Colusa
Glenn
Madera
Mariposa
Merced
Shasta
Stanislaus
Tehama
Tuolumne

Vervain, California
Verbena californica
Tuolumne

Wallflower, Ben Lomond
Erysimum teretifolium
Santa Cruz

Wallflower, Contra Costa
Erysimum capitatum var.
Contra Costa

Wallflower, Menzie's
Erysimum menziesii

Dicot

Humboldt
Mendocino
Monterey

Watercress, Gambel's
Rorippa gambellii

Los Angeles
San Bernardino
San Diego
San Luis Obispo
Ventura

Woodland-star, San Clemente Island
Lithophragma maximum

Los Angeles

Woolly-star, Santa Ana River
Eriastrum densifolium ssp. sanctorum

Riverside

San Bernardino

Woolly-threads, San Joaquin
Monolopia (=Lembertia) congdonii

Fresno
Kern

Kings
San Benito
San Luis Obispo
Santa Barbara
Tulare

Yerba Santa, Lompoc
Eriodictyon capitatum

Santa Barbara

Gastropod

Snail, Morro Shoulderband
Helminthoglypta walkeriana

San Luis Obispo

Insect

Beetle, Delta Green Ground
Elaphrus viridis

Solano

Beetle, Mount Hermon June
Polyphylla barbata

Santa Cruz

Beetle, Ohlone Tiger
Cicindela ohlone

Santa Cruz

Insect

Beetle, Valley Elderberry Longhorn
Desmocerus californicus dimorphus

Butte
Colusa
El Dorado
Fresno
Glenn
Madera
Mariposa
Merced
Placer
Sacramento
San Joaquin
Solano
Stanislaus
Sutter
Tehama
Yolo
Yuba

Butterfly, Bay Checkerspot
(Wright's euphydryas)
Euphydryas editha bayensis

Alameda
Contra Costa
San Mateo
Santa Clara

Butterfly, Behren's Silverspot
Speyeria zerene behrensii

Mendocino
Sonoma

Butterfly, Callippe Silverspot
Speyeria callippe callippe

Alameda

San Mateo

Butterfly, El Segundo Blue
Euphilotes battoides allyni

Los Angeles

Butterfly, Lange's Metalmark
Apodemia mormo langei

Contra Costa

Butterfly, Lotis Blue
Lycaeides argyrognomon lotis

Mendocino

Insect

Butterfly, Mission Blue
Icaricia icarioides missionensis

Marin
San Mateo

Butterfly, Myrtle's Silverspot
Speyeria zerene myrtleae

Marin
Sonoma

Butterfly, Palos Verdes Blue
Glaucopsyche lygdamus palosverdesensis

Los Angeles

Butterfly, Quino Checkerspot
Euphydryas editha quino (=E. e. wrighti)

Riverside

San Diego

Butterfly, San Bruno Elfin
Callophrys mossii bayensis

San Mateo

Butterfly, Smith's Blue
Euphilotes enoptes smithi

Monterey

Fly, Delhi Sands Flower-loving
Rhaphiomidas terminatus

Riverside
San Benito
San Bernardino

Grasshopper, Zayante Band-
Trimerotropis infantilis

Santa Cruz

Moth, Kern Primrose Sphinx
Euproserpinus euterpe
Euproserpinus euterpe

Kern
Kern

Skipper, Laguna Mountain
Skipper, Laguna Mountain
Pyrgus ruralis lagunae

San Diego

Mammal

Fox, San Joaquin Kit
Vulpes macrotis mutica

Alameda
Contra Costa
Fresno
Kern

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Mammal

Kings
Madera
Merced
Monterey
Napa

San Benito
San Joaquin
San Luis Obispo
Santa Barbara

Santa Clara
Stanislaus
Tulare

Fox, San Miguel Island
Urocyon littoralis littoralis

Santa Barbara

Fox, Santa Catalina Island

Urocyon littoralis catalinae
Los Angeles

Fox, Santa Cruz Island

Urocyon littoralis santacruzae
Santa Barbara

Fox, Santa Rosa Island
Urocyon littoralis santarosae
Santa Barbara

Kangaroo Rat, Fresno
Dipodomys nitratoides exilis
Fresno
Kings
Madera
Merced

Kangaroo Rat, Giant
Dipodomys ingens

Fresno
Kern
Kings
Merced
Monterey
San Benito
San Luis Obispo
Santa Barbara
Tulare
Kangaroo Rat, Morro Bay
Dipodomys heermanni morroensis
San Luis Obispo

Mammal

Kangaroo Rat, San Bernardino
Merriam's
Dipodomys merriami parvus
Riverside
San Bernardino

Kangaroo Rat, Stephens'
Dipodomys stephensi (incl. D.
Riverside
San Bernardino

San Diego
Kangaroo Rat, Tipton
Dipodomys nitratoides nitratoides
Kern

Kings

Tulare

Mountain Beaver, Point Arena

Aplodontia rufa nigra
Mendocino

Mouse, Pacific Pocket

Perognathus longimembris
Los Angeles

San Diego

Mouse, Salt Marsh Harvest
Reithrodontomys raviventris
Alameda

Contra Costa
Marin
Napa
San Mateo
Santa Clara
Solano

Sonoma

Rabbit, Riparian Brush
Sylvilagus bachmani riparius
San Joaquin
Sheep, Peninsular Bighorn
Ovis canadensis
Imperial
Inyo
Riverside
San Diego
Sheep, Sierra Nevada Bighorn
Ovis canadensis californiana
Inyo

Mammal

San Diego
Shrew, Buena Vista Lake Ornate
Sorex ornatus relictus
Kern

Vole, Amargosa
Microtus californicus scirpensis
Inyo
San Bernardino

Woodrat, Riparian
Neotoma fuscipes riparia
San Joaquin

Monocot

Alopecurus, Sonoma
Alopecurus, Sonoma
Alopecurus aequalis var.

Marin

Sonoma

Amole, Cammatta Canyon
Chlorogalum purpureum var.

San Luis Obispo

Amole, Purple
Chlorogalum purpureum var.
purpureum
purpureum
Monterey
San Luis Obispo
Bluegrass, Napa
Bluegrass, Napa
Poa napensis
Napa
Bluegrass, San Bernardino
Poa atropurpurea
San Bernardino
San Diego
San Diego

Brodiaea, Chinese Camp
Brodiaea pallida
Tuolumne
Brodiaea, Thread-leaved
Brodiaea filifolia
Los Angeles
Riverside
San Bernardino
San Diego
Grass, California Orcutt
Orcuttia californica
Riverside
San Diego

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Monocot

Ventura

Grass, Colusa
Neostapfia colusana

Calaveras
Mariposa
Merced
Solano
Stanislaus
Tuolumne
Yolo

Grass, Eureka Dune
Swallenia alexandrae

Inyo

Grass, San Joaquin Valley Orcutt
Orcuttia inaequalis

Butte
Fresno
Madera

Jumping

Mariposa
Merced
Sacramento
Solano
Tulare

Grass, Solano
Tuctoria mucronata

Solano

Yolo

Lily, Pitkin Marsh
Lilium pardalinum ssp. pitkinense

Sonoma

Lily, Western
Lilium occidentale

Humboldt

Onion, Munz's
Allium munzii

Riverside

Piperia, Yadon's
Piperia yadonii

Monterey

Sedge, White
Carex albida

Sonoma

Reptile

Lizard, Blunt-nosed Leopard
Gambelia silus

Fresno
Kern
Kings
Los Angeles
Madera
Merced
San Benito
San Luis Obispo
Santa Barbara
Tulare
Ventura

Lizard, Coachella Valley Fringe-
Uma inornata

Riverside

Lizard, Island Night
Xantusia riversiana

Los Angeles
Santa Barbara
Ventura

Sea turtle, olive ridley
Lepidochelys olivacea

Humboldt
Mendocino
Monterey

San Diego

Snake, Giant Garter
Thamnophis gigas

Butte
Colusa
Fresno
Glenn
Merced
Sacramento
San Joaquin
Sutter

Yolo

Snake, San Francisco Garter
Thamnophis sirtalis tetrataenia

San Mateo
Santa Cruz

Tortoise, Desert
Gopherus agassizii

Reptile

Imperial
Inyo
Kern
Los Angeles
Riverside
San Bernardino

Whipsnake (=Striped Racer),
Masticophis lateralis euryxanthus

Alameda
Contra Costa

Colorado

Insect

Skipper, Pawnee Montane
Hesperia leonardus montana

Jefferson

Mammal

Mouse, Preble's Meadow
Zapus hudsonius preblei

Elbert
Jefferson

Monocot

Ladies'-tresses, Ute
Spiranthes diluvialis

Jefferson

Connecticut

Bird

Plover, Piping
Charadrius melodus

New London

Bivalve

Mussel, Dwarf Wedge
Alasmidonta heterodon

Hartford

Dicot

Gerardia, Sandplain
Agalinis acuta

Windham

Mammal

Bat, Indiana
Myotis sodalis

Windham

Florida

Amphibian

Salamander, Flatwoods

Ambystoma cingulatum

Baker
Bradford
Calhoun
Holmes
Jackson
Jefferson
Liberty
Okaloosa
Santa Rosa
Wakulla
Walton
Washington

americana

Bird

Caracara, Audubon's Crested

Polyborus plancus audubonii

Charlotte
Hardee
Hendry
Highlands
Manatee
Martin
Orange
Osceola
Palm Beach
Polk

Kite, Everglade Snail

Rostrhamus sociabilis plumbeus

Broward
Citrus
Dade
Hendry
Highlands
Lake
Lee
Marion
Martin
Orange
Osceola
Palm Beach
Polk

Bird

Sumter
Volusia

Plover, Piping

Charadrius melodus

Bay
Dade
Duval
Escambia
Hillsborough
Lee
Manatee
Martin
Nassau
Okaloosa
Palm Beach
Pasco

Pinellas
Santa Rosa
Volusia
Wakulla
Walton

Scrub-Jay, Florida

Aphelocoma coerulescens

Alachua
Charlotte
Citrus
Clay
Dixie
Gilchrist
Hardee
Hendry
Highlands
Hillsborough
Lake
Lee
Levy
Manatee
Marion
Martin
Orange
Osceola
Palm Beach
Pasco
Pinellas

Bird

Polk
Putnam
Seminole
Seminole

Sumter
Volusia

Sparrow, Cape Sable Seaside

Ammodramus maritimus mirabilis

Dade

Sparrow, Florida Grasshopper

Ammodramus savannarum

Dade
Highlands
Osceola
Polk

Stork, Wood

Stork, Wood *Mycteria*

Alachua
Baker
Bay
Bradford
Broward
Calhoun
Charlotte
Citrus
Clay
Columbia
Dade
Dixie
Duval
Escambia
Gadsden
Gilchrist
Hamilton
Hardee
Hendry
Highlands
Hillsborough
Holmes
Jackson
Jefferson
Lafayette
Lake
Lee
Leon

US EPA ARCHIVE DOCUMENT

Bird

Levy
Liberty
Madison
Manatee
Marion
Martin
Nassau
Okaloosa
Orange
Osceola
Palm Beach
Pasco
Pinellas
Polk
Putnam
Santa Rosa
Seminole
Sumter
Suwannee
Union
Volusia
Wakulla
Walton
Washington

Woodpecker, Red-cockaded
Picoides borealis
Alachua
Baker
Bay
Bradford
Broward
Charlotte
Citrus
Clay
Columbia
Dade
Dixie
Duval
Escambia
Gilchrist
Hamilton
Hardee
Hendry
Highlands

Bird

Hillsborough
Holmes
Jackson
Lafayette
Lake
Lee
Leon
Levy
Liberty
Madison
Manatee
Marion
Martin
Nassau
Okaloosa
Orange
Osceola
Palm Beach
Pasco
Pinellas
Polk
Putnam
Santa Rosa
Seminole
Sumter
Suwannee
Union
Volusia
Wakulla
Walton
Washington

Bivalve

Bankclimber, Purple
Elliptoideus sloatianus
Calhoun
Gadsden
Jackson
Leon
Liberty
Wakulla

Mussel, Gulf Moccasinshell
Medionidus penicillatus
Calhoun
Gadsden

Bivalve

Jackson

Mussel, Ochlockonee
Medionidus simpsonianus
Gadsden
Leon
Liberty
Wakulla

Mussel, Oval Pigtoe
Pleurobema pyriforme
Alachua
Bay
Bradford
Calhoun
Columbia
Gadsden
Jackson
Leon
Union
Washington

Mussel, Shiny-rayed Pocketbook
Lampsilis subangulata
Calhoun
Gadsden
Jackson
Leon

Slabshell, Chipola
Elliptio chipolaensis
Calhoun
Jackson

Threeridge, Fat (Mussel)
Amblema neislerii
Calhoun
Gadsden

Conf/cycds

Torreya, Florida
Torreya taxifolia
Gadsden
Jackson
Liberty

Crustacean

Shrimp, Squirrel Chimney Cave
Shrimp, Squirrel Chimney Cave
Palaemonetes cummingi
Alachua

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Dicot

Aster, Florida Golden
Chrysopsis floridana
Hardee
Hillsborough
Pinellas

Birds-in-a-nest, White
Macbridea alba
Bay
Liberty

Blazing Star, Scrub
Liatris ohlingerae
Highlands
Polk

Bonamia, Florida
Bonamia grandiflora
Charlotte
Hardee
Highlands
Lake
Lee
Marion
Orange
Osceola
Polk

Buckwheat, Scrub
Eriogonum longifolium var. gnaphalifolium
Highlands
Lake
Marion
Orange
Osceola
Polk

Butterwort, Godfrey's
Pinguicula ionantha
Bay
Liberty

Campion, Fringed
Silene polypetala
Gadsden

Chaffseed, American
Schwalbea americana
Gadsden

Dicot

Fringe Tree, Pygmy
Chionanthus pygmaeus
Hardee
Highlands
Lake
Osceola
Polk

Gooseberry, Miccosukee
Ribes echinellum
Jefferson

Gourd, Okeechobee
Cucurbita okeechobeensis ssp. okeechobeensis
Palm Beach

Harebells, Avon Park
Crotalaria avonensis
Highlands
Polk

Hypericum, Highlands Scrub
Hypericum cumulicola
Highlands
Polk

Jacquemontia, Beach
Jacquemontia reclinata
Broward
Dade
Palm Beach

Lead-plant, Crenulate
Amorpha crenulata
Dade

Lupine, Scrub
Lupinus aridorum
Orange
Polk

Meadowrue, Cooley's
Thalictrum cooleyi
Walton

Milkpea, Small's
Galactia smallii
Dade

Mint, Garrett's
Dicerandra christmanii
Highlands

Dicot

Mint, Longspurred
Dicerandra cornutissima
Marion

Mint, Scrub
Dicerandra frutescens
Highlands

Mustard, Carter's
Warea carteri
Highlands
Polk

Pawpaw, Beautiful
Deeringothamnus pulchellus
Charlotte
Lee
Lee
Orange

Pawpaw, Four-petal
Asimina tetramera
Martin
Palm Beach

Pawpaw, Rugel's
Deeringothamnus rugelii
Volusia

Pinkroot, Gentian
Spigelia gentianoides
Calhoun
Calhoun
Jackson

Plum, Scrub
Prunus geniculata
Highlands
Lake
Osceola
Polk

Polygala, Lewton's
Polygala lewtonii
Highlands
Lake
Marion
Osceola
Polk

Polygala, Tiny
Polygala smallii
Broward
Dade
Martin

Dicot

Palm Beach

Rhododendron, Chapman
Rhododendron chapmanii
Clay
Gadsden
Liberty

Rosemary, Apalachicola
Conradina glabra
Liberty

Rosemary, Etonia
Conradina etonia
Putnam

Rosemary, Short-leaved
Conradina brevifolia
Highlands
Polk

Sandlace
Polygonella myriophylla
Highlands
Orange
Osceola
Polk

Skullcap, Florida
Scutellaria floridana
Liberty

Snakeroot
Eryngium cuneifolium
Highlands
Putnam

Spurge, Deltoid
Chamaesyce deltoidea ssp.

Dade

Spurge, Garber's
Chamaesyce garberi

Dade

Spurge, Telephus
Euphorbia telephioides
Bay

Warea, Wide-leaf
Warea amplexifolia
Lake
Osceola
Polk

Dicot

Whitlow-wort, Papery
Paronychia chartacea
Highlands
Lake
Orange
Osceola
Polk

Wings, Pigeon
Clitoria fragrans
Highlands
Lake
Polk

Wireweed
Polygonella basiramia
Highlands
Polk

Ziziphus, Florida
Ziziphus celata
Highlands
Polk

Insect

Butterfly, Schaus Swallowtail
Heraclides aristodemus ponceanus
Dade

Mammal

Bat, Gray
Myotis grisescens
Jackson

Bat, Indiana
Myotis sodalis

Jackson

Mouse, Choctawhatchee Beach
Peromyscus polionotus allophrys

Bay
Walton

Mouse, Perdido Key Beach
Peromyscus polionotus trissyllepsis
Escambia

Panther, Florida
Puma (=Felis) concolor coryi
Broward
Charlotte
Dade

Mammal

Hendry
Highlands
Lee
Osceola
Palm Beach
Polk

Vole, Florida Salt Marsh
Microtus pennsylvanicus
Levy

Monocot

Beargrass, Britton's
Nolina brittoniana
Highlands
Lake
Orange
Osceola
Polk

Beauty, Harper's
Harperocallis flava
Liberty

Seagrass, Johnson's
Halophila johnsonii
Broward
Martin
Palm Beach

Reptile

Crocodile, American
Crocodylus acutus
Broward
Broward
Dade
Lee
Lee

Sea turtle, green
Chelonia mydas
Bay
Bay
Broward
Charlotte
Citrus
Dade
Dixie
Duval
Escambia
Hillsborough
Lee
Levy

US EPA ARCHIVE DOCUMENT

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Reptile

Manatee
Martin
Nassau
Okaloosa
Palm Beach
Pasco
Pinellas
Santa Rosa
Volusia
Walton

Sea turtle, hawksbill
Eretmochelys imbricata

Broward
Dade
Duval
Martin
Nassau
Palm Beach
Pasco
Volusia

Sea turtle, Kemp's ridley
Lepidochelys kempii

Lee
Pasco
Pinellas
Volusia

Sea turtle, leatherback
Dermochelys coriacea

Bay
Broward
Charlotte
Citrus
Dade
Dixie
Duval
Escambia
Hillsborough
Lee
Levy
Manatee
Martin
Nassau
Okaloosa
Palm Beach

Reptile

Pasco
Pinellas
Santa Rosa
Volusia
Walton

Sea turtle, loggerhead
Caretta caretta

Bay
Broward
Charlotte
Citrus
Dade
Dixie
Duval
Escambia
Hillsborough
Lee
Levy
Manatee
Martin
Nassau
Okaloosa
Palm Beach
Pasco
Pinellas
Santa Rosa
Volusia
Walton

Skink, Blue-tailed Mole
Eumeces egregius lividus

Highlands
Osceola
Polk

Skink, Sand
Neoseps reynoldsi

Highlands
Lake
Marion
Orange
Osceola
Polk

Snake, Atlantic Salt Marsh
Nerodia clarkii taeniata

Volusia

Reptile

Snake, Eastern Indigo
Drymarchon corais couperi

Alachua
Baker
Bay
Bradford
Broward
Calhoun
Charlotte
Citrus
Clay
Columbia
Dade
Dixie
Duval
Escambia
Gadsden
Gilchrist
Hamilton
Hardee
Hendry
Highlands
Hillsborough
Holmes
Jackson
Jefferson
Lafayette
Lake
Lee
Leon
Levy
Liberty
Madison
Manatee
Marion
Martin
Nassau
Okaloosa
Orange
Osceola
Palm Beach
Pasco
Pinellas
Polk

Reptile

Putnam
Santa Rosa
Seminole
Sumter
Suwannee
Union
Volusia
Wakulla
Walton
Washington

Georgia

Amphibian

Salamander, Flatwoods
Ambystoma cingulatum
Baker
Evans
Liberty
Miller

Bird

Plover, Piping
Charadrius melodus
Camden
Chatham
Glynn
Liberty
Marion

Stork, Wood
Mycteria americana
Appling
Atkinson
Bacon
Baker
Baldwin
Ben Hill
Berrien
Bibb
Bleckley
Brantley
Brooks
Bulloch
Burke
Calhoun
Camden

Bird

Candler
Charlton
Chatham
Clay
Clinch
Coffee
Colquitt
Columbia
Cook
Crawford
Crisp
Decatur
Dodge
Dooly
Dougherty
Early
Echols
Effingham
Emanuel
Evans
Floyd
Glascock
Glynn
Grady
Hancock
Houston
Irwin
Jeff Davis
Jefferson
Jenkins
Johnson
Jones
Lanier
Laurens
Lee
Liberty
Long
Lowndes
Macon
Marion
McDuffie
Miller
Mitchell
Montgomery

Bird

Muscogee
Peach
Pierce
Pulaski
Quitman
Randolph
Richmond
Schley
Screven
Seminole
Stewart
Sumter
Talbot
Tattnall
Taylor
Telfair
Terrell
Thomas
Tift
Toombs
Treutlen
Turner
Twiggs
Ware
Warren
Washington
Wayne
Webster
Wheeler
Wilcox
Wilkinson
Worth

Warbler (=Wood), Kirtland's
Dendroica kirtlandii
Camden
Chatham
Glynn
Liberty
Long

Woodpecker, Red-cockaded
Picoides borealis
Appling
Atkinson
Bacon

US EPA ARCHIVE DOCUMENT

US EPA ARCHIVE DOCUMENT

Bird

Baker
Baldwin
Banks
Ben Hill
Berrien
Bibb
Bleckley
Brantley
Brooks
Bulloch
Burke
Butts
Calhoun
Camden
Candler
Carroll
Charlton
Chatham
Clarke
Clay
Clinch
Cobb
Coffee
Colquitt
Columbia
Cook
Coweta
Crawford
Crisp
Decatur
Dodge
Dooly
Dougherty
Early
Echols
Effingham
Elbert
Emanuel
Evans
Fayette
Floyd
Forsyth
Franklin
Fulton

Bird

Glascock
Glynn
Grady
Greene
Gwinnett
Hall
Hancock
Haralson
Harris
Hart
Heard
Henry
Houston
Irwin
Jasper
Jeff Davis
Jefferson
Jenkins
Johnson
Jones
Lamar
Lanier
Laurens
Lee
Liberty
Lincoln
Long
Lowndes
Macon
Madison
Marion
Meriwether
Miller
Mitchell
Monroe
Montgomery
Morgan
Muscogee
Newton
Oconee
Oglethorpe
Paulding
Peach
Pierce

Bird

Pike
Pulaski
Quitman
Randolph
Richmond
Rockdale
Schley
Screven
Seminole
Spalding
Stephens
Stewart
Sumter
Talbot
Taliaferro
Tattnall
Taylor
Telfair
Terrell
Thomas
Tift
Toombs
Treutlen
Troup
Turner
Twiggs
Upson
Walton
Ware
Warren
Washington
Wayne
Webster
Wheeler
Wilcox
Wilkes
Wilkinson
Worth

Bivalve

Bankclimber, Purple
Elliptoideus sloatianus
Baker
Coweta
Crawford

US EPA ARCHIVE DOCUMENT

Bivalve

Crisp
Decatur
Dooly
Dougherty
Lee
Macon
Mitchell
Muscogee
Worth

Combshell, Upland
Epioblasma metastriata
Bartow
Chattooga
Floyd

Fanshell
Cyprogenia stegaria
Lincoln

Kidneyshell, Triangular
Ptychobranchus greenii
Bartow
Chattooga
Cherokee
Floyd

Mucket, Pink (Pearlymussel)
Lampsilis abrupta
Calhoun

Mussel, Acornshell Southern
Epioblasma othcaloogensis
Chattooga

Mussel, Alabama Moccasinshell
Medionidus acutissimus
Bartow
Chattooga
Floyd

Mussel, Coosa Moccasinshell
Medionidus parvulus
Chattooga
Floyd

Mussel, Fine-lined Pocketbook
Lampsilis altilis
Floyd

Mussel, Gulf Moccasinshell
Medionidus penicillatus
Baker

Bivalve

Calhoun
Coweta
Crisp
Decatur
Dooly
Dougherty
Fulton
Harris
Lee
Meriwether
Muscogee
Pike
Sumter
Taylor
Terrell
Webster
Worth

Mussel, Oval Pigtoe
Pleurobema pyriforme
Baker
Coweta
Crisp
Dooly
Early
Lee
Macon
Meriwether
Miller
Muscogee
Spalding
Sumter
Taylor
Terrell
Webster
Worth

Mussel, Ovate Clubshell
Pleurobema perovatum
Bartow
Cherokee
Floyd

Mussel, Shiny-rayed Pocketbook
Lampsilis subangulata
Baker
Coweta

Bivalve

Crisp
Decatur
Dougherty
Early
Fulton
Lee
Macon
Meriwether
Miller
Muscogee
Pike
Seminole
Spalding
Sumter
Taylor
Terrell
Webster
Worth

Mussel, Southern Clubshell
Pleurobema decisum
Chattooga
Cherokee
Floyd

Mussel, Southern Pigtoe
Pleurobema georgianum
Chattooga
Floyd

Threeridge, Fat (Mussel)
Amblema neislerii
Decatur
Dougherty
Macon

Conf/cycds

Torreya, Florida
Torreya taxifolia
Decatur

Dicot

Amphianthus, Little
Amphianthus pusillus
Butts
Columbia
Greene
Gwinnett
Hancock

Dicot

Harris
Heard
Henry
Meriwether
Newton
Oglethorpe
Pike
Rockdale
Walton

Barbara Buttons, Mohr's
Marshallia mohrii
Cherokee
Floyd

Campion, Fringed
Silene polypetala
Bibb
Crawford
Decatur
Talbot
Taylor
Upson

Dropwort, Canby's
Oxypolis canbyi
Burke
Dooly
Jenkins
Lee
Screven
Sumter

Harperella
Ptilimnium nodosum
Greene

Pitcher-plant, Green
Sarracenia oreophila
Chattooga
Taylor
Troup

Pondberry
Lindera melissifolia
Wheeler

Rattleweed, Hairy
Baptisia arachnifera
Brantley
Wayne

Dicot

Skullcap, Large-flowered
Scutellaria montana
Chattooga
Floyd

Sumac, Michaux's
Rhus michauxii
Elbert

Ferns

Quillwort, Black-spored
Isoetes melanospora
Butts
Greene
Gwinnett
Heard
Newton
Pike
Rockdale

Quillwort, Mat-forming
Isoetes tegetiformans
Columbia
Greene
Gwinnett
Hancock
Rockdale

Insect

Beetle, American Burying
Nicrophorus americanus
Lamar

Mammal

Bat, Gray
Myotis grisescens
Bartow
Butts
Chattooga
Cherokee
Clarke
Floyd
Gwinnett
Haralson
Paulding
Upson

Bat, Indiana
Myotis sodalis

Mammal

Banks
Bartow
Butts
Calhoun
Carroll
Chattooga
Cherokee
Clarke
Clay
Cobb
Coweta
Crawford
Early
Fayette
Floyd
Forsyth
Fulton
Gwinnett
Hall
Haralson
Harris
Heard
Henry
Jasper
Lamar
Madison
Marion
Meriwether
Miller
Monroe
Monroe
Morgan
Muscogee
Newton
Newton
Oconee
Paulding
Pike
Quitman
Randolph
Randolph
Rockdale
Schley
Seminole
Seminole
Spalding
Stephens
Stewart
Stewart

US EPA ARCHIVE DOCUMENT

US EPA ARCHIVE DOCUMENT

Mammal

Talbot
Terrell
Troup
Union
Upson
Walton
Webster

Bat, Virginia Big-eared
Corynorhinus (=Plecotus) townsendii virginianus

Clinch

Monocot

Grass, Tennessee Yellow-eyed
Xyris tennesseensis
Bartow

Pogonia, Small Whorled
Isotria medeoloides
Bartow
Chattooga
Cherokee
Floyd
Union

Trillium, Persistent
Trillium persistens
Stephens

Trillium, Relict
Trillium reliquum
Bibb
Clay
Columbia
Early
Lee
Macon
Muscogee
Quitman
Talbot
Upson

Water-plantain, Kral's
Sagittaria secundifolia
Chattooga

Reptile

Sea turtle, loggerhead
Caretta caretta
Camden
Chatham
Glynn
Liberty
Marion

Snake, Eastern Indigo
Drymarchon corais couperi
Appling
Atkinson
Bacon
Baker
Ben Hill
Berrien
Bibb
Bleckley
Brantley
Brooks
Bulloch
Burke
Calhoun
Camden
Candler
Charlton
Chatham
Clay
Clinch
Coffee
Colquitt
Cook
Crawford
Crisp
Decatur
Dodge
Dooly
Dougherty
Early
Echols
Effingham
Emanuel
Evans
Glynn
Grady
Houston
Irwin
Jeff Davis

Reptile

Jenkins
Johnson
Lanier
Laurens
Lee
Liberty
Long
Lowndes
Macon
Marion
Miller
Mitchell
Montgomery
Pierce
Pulaski
Quitman
Randolph
Screven
Seminole
Stewart
Sumter
Tattnall
Taylor
Telfair
Terrell
Thomas
Tift
Toombs
Treutlen
Turner
Twiggs
Ware
Washington
Wayne
Webster
Wheeler
Wilcox
Worth

Hawaii

Arachnid

Spider, Kauai Cave Wolf
Gopherus polyphemus
Kauai

US EPA ARCHIVE DOCUMENT

Bird

'Akepa, Hawaii
Loxops coccineus coccineus
Hawaii
'Akepa, Maui
Loxops coccineus ochraceus
Maui
'Akia Loa, Kauai (Hemignathus procerus)

Hemignathus procerus
Kauai
'Akia Pola'au (Hemignathus munroi)
Hemignathus munroi
Hawaii

Albatross, Short-tailed
Phoebastria (=Diomedea) albatrus
Honolulu

Coot, Hawaiian (=Alae keo keo)
Fulica americana alai
Hawaii

Honolulu
Kauai
Maui

Creeper, Hawaii
Oreomystis mana
Hawaii
Creeper, Molokai (Kakawahie)
Paroreomyza flammea

Maui
Creeper, Oahu (Alauwahio)
Paroreomyza maculata
Honolulu

Crow, Hawaiian ('Alala)
Corvus hawaiiensis
Hawaii

Duck, Hawaiian (Koloa)
Anas wyvilliana
Hawaii
Honolulu

Kauai

Duck, Laysan
Anas laysanensis

Honolulu

Elepaio, Oahu
Chasiempis sandwichensis ibidis

Bird

Honolulu
Finch, Laysan
Telespyza cantans
Honolulu
Finch, Nihoa
Telespyza ultima
Honolulu

Goose, Hawaiian (Nene)
Branta (=Nesochen) sandvicensis
Hawaii
Kauai
Maui

Hawk, Hawaiian (Io)
Buteo solitarius
Hawaii

Honeycreeper, Crested
Palmeria dolei
Maui

Millerbird, Nihoa
Acrocephalus familiaris kingi
Honolulu

Moorhen, Hawaiian Common
Gallinula chloropus sandvicensis
Honolulu
Kauai
Maui

Nuku Pu'u
Hemignathus lucidus
Kauai
Maui

'O'o, Kauai (='A'a)
Moho braccatus
Kauai

'O'u (Honeycreeper)
Psittirostra psittacea
Hawaii
Kauai

Palila
Loxioides bailleui

Hawaii

Parrotbill, Maui
Pseudonestor xanthophrys

Maui

Bird

Petrel, Hawaiian Dark-rumped
Pterodroma phaeopygia
Hawaii
Kauai
Maui
Po'ouli
Melamprosops phaeosoma
Maui
Maui
Shearwater, Newell's Townsend's
Puffinus auricularis newelli
Hawaii
Honolulu
Kauai
Kauai
Stilt, Hawaiian (=Ae'o)
Himantopus mexicanus knudseni
Hawaii
Hawaii
Honolulu
Kauai
Maui
Maui
Thrush, Large Kauai
Myadestes myadestinus
Kauai
Kauai
Thrush, Molokai (Oloma'o)
Myadestes lanaiensis rutha
Maui
Thrush, Small Kauai (Puaiohi)
Myadestes palmeri
Myadestes palmeri
Kauai

Crustacean

Amphipod, Kauai Cave
Amphipod, Kauai Cave
Spelaeorchestia koloana
Kauai

Dicot

Abutilon eremitopetalum (ncn)
Abutilon eremitopetalum (ncn)
Abutilon eremitopetalum
Maui
Abutilon sandwicense (ncn)
Abutilon sandwicense
Abutilon sandwicense
Honolulu

Achyranthes mutica (ncn)
Achyranthes mutica
Achyranthes mutica
Hawaii

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Dicot

Achyranthes splendens var. rotundata (ncn)
Achyranthes splendens var.
Honolulu

A'e (Zanthoxylum dipetalum var. tomentosum)
Zanthoxylum dipetalum var. tomentosum
Hawaii

A'e (Zanthoxylum hawaiiense)
Zanthoxylum hawaiiense
Hawaii
Kauai
Maui

'Aiea (Nothocestrum breviflorum)
Nothocestrum breviflorum
Hawaii

'Aiea (Nothocestrum peltatum)
Nothocestrum peltatum
Kauai

'Akoko (Chamaesyce celastroides var. kaenana)
Chamaesyce celastroides var.
Honolulu

'Akoko (Chamaesyce deppeana)
Chamaesyce deppeana
Honolulu

'Akoko (Chamaesyce herbstii) molokaiensis)
Chamaesyce herbstii
Honolulu

'Akoko (Chamaesyce kuwaleana)
Chamaesyce kuwaleana
Honolulu

'Akoko (Chamaesyce rockii)
Chamaesyce rockii
Honolulu

'Akoko (Chamaesyce skottsbergii var. skottsbe
Chamaesyce skottsbergii var. kalaeloana
Honolulu
Maui

'Akoko (Euphorbia haeleeleana)
Euphorbia haeleeleana
Honolulu
Kauai

Dicot

Alani (Melicope adscendens)
Melicope adscendens
Maui

Alani (Melicope balloui)
Melicope balloui
Maui

Alani (Melicope haupuensis)
Melicope haupuensis
Kauai

Alani (Melicope knudsenii)
Melicope knudsenii
Kauai
Maui

Alani (Melicope lydgatei)
Melicope lydgatei
Honolulu

Alani (Melicope mucronulata)
Melicope mucronulata
Maui

Alani (Melicope munroi)
Melicope munroi
Maui

Alani (Melicope ovalis)
Melicope ovalis
Maui

Alani (Melicope pallida)
Melicope pallida
Kauai

Alani (Melicope quadrangularis)
Melicope quadrangularis
Kauai

Alani (Melicope reflexa)
Melicope reflexa
Maui

Alani (Melicope saint-johnii)
Melicope saint-johnii
Honolulu

Alani (Melicope zahlbruckneri)
Melicope zahlbruckneri
Hawaii

Alsinidendron obovatum (ncn)
Alsinidendron obovatum
Honolulu

Dicot

Alsinidendron trinerve (ncn)
Alsinidendron trinerve
Honolulu

Alsinidendron viscosum (ncn)
Alsinidendron viscosum
Kauai

Amaranthus brownii (ncn)
Amaranthus brownii
Honolulu

'Anaunau (Lepidium arbuscula)
Lepidium arbuscula
Honolulu

'Anunu (Sicyos alba)
Sicyos alba
Hawaii

Aupaka (Isodendrion hosakae)
Isodendrion hosakae
Hawaii

Aupaka (Isodendrion laurifolium)
Isodendrion laurifolium
Honolulu
Kauai

Aupaka (Isodendrion longifolium)
Isodendrion longifolium
Honolulu
Kauai
Kauai

'Awikiwiki (Canavalia
Canavalia molokaiensis
Maui
Maui

'Awiwi (Centaurium sebaeoides)
Centaurium sebaeoides
Kauai
Kauai
Maui

'Awiwi (Hedyotis cookiana)
Hedyotis cookiana
Hedyotis cookiana
Hawaii
Kauai

Bonamia menziesii (ncn)
Bonamia menziesii
Hawaii
Honolulu
Kauai
Maui

Dicot

Chamaesyce Halemanui (ncn)
Chamaesyce halemanui
Kauai

Cyanea undulata (ncn)
Cyanea undulata
Kauai

Delissea rhytodisperma (ncn)
Delissea rhytidosperma
Kauai

Dubautia latifolia (ncn)
Dubautia latifolia
Kauai

Dubautia pauciflorula (ncn)
Dubautia pauciflorula
Kauai

Geranium, Hawaiian Red-flowered

Geranium arboreum
Maui

Gouania hillebrandii (ncn)
(=Rollandia St-Johnii)
Gouania hillebrandii
Maui

Gouania meyenii (ncn)

Gouania meyenii
Honolulu
Kauai

Gouania vitifolia (ncn)
Gouania vitifolia
Honolulu

Haha (Cyanea acuminata)
Cyanea acuminata
Honolulu

Haha (Cyanea asarifolia)
Cyanea asarifolia
Kauai

Haha (Cyanea copelandii ssp. copelandii)
Cyanea copelandii ssp. copelandii
Hawaii

Haha (Cyanea copelandii ssp. haleakalaensis)
Cyanea copelandii ssp.

Maui

Haha (Cyanea Crispa) (=Rollandia crispa)
Cyanea (=Rollandia) crispa

Dicot

Honolulu

Haha (Cyanea dunbarii)
Cyanea dunbarii
Maui

Haha (Cyanea glabra)
Cyanea glabra
Maui

Haha (Cyanea grimesiana ssp. grimesiana)
Cyanea grimesiana ssp. grimesiana

Honolulu
Maui

Haha (Cyanea grimesiana ssp.
Cyanea grimesiana ssp. obatae
Honolulu

Haha (Cyanea hamatiflora ssp. carlsonii)
Cyanea hamatiflora carlsonii
Hawaii

Haha (Cyanea hamatiflora ssp.

hamatiflora)
Cyanea hamatiflora ssp.
Maui

Haha (Cyanea humboldtiana)
Cyanea humboldtiana
Honolulu

Haha (Cyanea koolauensis)
Cyanea koolauensis
Honolulu

Haha (Cyanea longiflora)
Cyanea longiflora
Honolulu

Haha (Cyanea Macrostegia var. gibsonii)
Cyanea macrostegia ssp. gibsonii
Maui

Haha (Cyanea mannii)
Cyanea mannii
Maui

Haha (Cyanea mceldowneyi)
Cyanea mceldowneyi

Maui

Haha (Cyanea pinnatifida)
Cyanea pinnatifida

Honolulu

Dicot

Haha (Cyanea platyphylla)
Cyanea platyphylla
Hawaii

Haha (Cyanea procera)
Cyanea procera
Maui

Haha (Cyanea recta)
Cyanea recta
Kauai

Haha (Cyanea remyi)
Cyanea remyi
Kauai

Haha (Cyanea shipmanii)
Cyanea shipmannii
Hawaii

Haha (Cyanea stictophylla)
Haha (Cyanea stictophylla)
Cyanea stictophylla
Hawaii

Haha (Cyanea St-Johnii)

(=Rollandia St-Johnii)
Cyanea st-johnii
Honolulu

Haha (Cyanea superba)
Cyanea superba
Honolulu

Ha'lwale (Cyrtandra crenata)
Cyrtandra crenata
Honolulu

Ha'lwale (Cyrtandra dentata)
Cyrtandra dentata
Honolulu

Ha'lwale (Cyrtandra giffardii)
Cyrtandra giffardii
Hawaii

Ha'lwale (Cyrtandra limahuliensis)
Ha'lwale (Cyrtandra limahuliensis)
Cyrtandra limahuliensis
Kauai

Ha'lwale (Cyrtandra munroi)
Cyrtandra munroi
Maui

Ha'lwale (Cyrtandra polyantha)
Cyrtandra polyantha
Cyrtandra polyantha
Honolulu

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Dicot

Ha'lwale (Cyrtandra subumbellata)
Cyrtandra subumbellata
Honolulu

Ha'lwale (Cyrtandra tintinnabula)
Cyrtandra tintinnabula
Honolulu
waimeae

Ha'lwale (Cyrtandra viridiflora)
Cyrtandra viridiflora
Honolulu

Haplostachys Haplostachya (ncn)
Haplostachys haplostachya
Hawaii

Hau Kauhiwi (Hibiscadelphus woodi)
Hibiscadelphus woodii
Kauai

ssp.
Hau Kuahiwi (Hibiscadelphus
Hibiscadelphus distans
Kauai
Heau (Exocarpos luteolus)
Exocarpos luteolus
Kauai
Hedyotis degeneri (ncn)
Hedyotis degeneri
Honolulu
Hedyotis parvula (ncn)
Hedyotis parvula
schlechtendahliana

schlechtendahliana
Honolulu

Hedyotis St.-Johnii (ncn)
Hedyotis st.-johnii
Kauai
lychnoides)
Hesperomannia arborescens (ncn)
Hesperomannia arborescens
Honolulu
Maui
Hesperomannia arbuscula (ncn)
Hesperomannia arbuscula
Honolulu
Maui
Hesperomannia lydgatei (ncn)
Hesperomannia lydgatei
princeps)

Dicot

Holei (Ochrosia kilaueaensis)
Ochrosia kilaueaensis
Hawaii

Iliau (Wilkesia hobdyi)
Wilkesia hobdyi
Kauai

Kamakahala (Labordia cyrtandrae)
Labordia cyrtandrae
Honolulu

Kamakahala (Labordia lydgatei)
Labordia lydgatei
Kauai

Kamakahala (Labordia tinifolia var. lanaiensis)
Labordia tinifolia var. lanaiensis
Maui

Kamakahala (Labordia tinifolia var. wahiawaen)
Labordia tinifolia var. wahiawaensis
Kauai

Kamakahala (Labordia triflora)
Labordia triflora
Maui

Kanaloa kahoolawensis (ncn)
Kanaloa kahoolawensis
Maui

Kauila (Colubrina oppositifolia)

Colubrina oppositifolia
Hawaii

Kaulu (Pteralyxia kauaiensis)
Pteralyxia kauaiensis
Kauai

Kio'Ele (Hedyotis coriacea)
Hedyotis coriacea
Hawaii
Maui

Kiponapona (Phyllostegia
Phyllostegia racemosa
Hawaii
Koki'o (Kokia drynarioides)
Kokia drynarioides

Dicot

Kauai
Koki'o Ke'oke'o (Hibiscus arnottianus ssp. immaculatus)
Hibiscus arnottianus ssp.

Maui
Koki'o Ke'oke'o (Hibiscus

ssp. hannerae)
Hibiscus waimeae ssp. hannerae

Kauai

Kolea (Myrsine juddii)
Myrsine juddii

Honolulu

Kolea (Myrsine linearifolia)
Myrsine linearifolia

Kauai
Ko'oko'olau (Bidens micrantha

kalealaha)
Bidens micrantha ssp. kalealaha

Maui
Ko'oko'olau (Bidens wiebkei)
Bidens wiebkei

Maui
Ko'oloa'ula (Abutilon menziesii)
Abutilon menziesii

Hawaii
Maui
Kopa (Hedyotis

Kopa (Hedyotis

var. remyi)
Hedyotis schlechtendahliana var.
Maui
Maui
Kuawawaenohu (Alsinidendron
Kuawawaenohu (Alsinidendron

Alsinidendron lychnoides

Kauai
Kulu'I (Nototrichium humile)
Nototrichium humile
Honolulu

Maui
Laukahi Kuahiwi (Plantago
Plantago hawaiensis
Hawaii
Laukahi Kuahiwi (Plantago

Kauai
Hibiscus, Clay's
Hibiscus clayi
Kauai

Hawaii
Koki'o (Kokia kauaiensis)
Kokia kauaiensis

Plantago princeps
Honolulu
Kauai

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Dicot

Maui
Laulihilihi (Schiedea stellarioides)
Schiedea stellarioides
Kauai
Lipochaeta venosa (ncn)

Lipochaeta venosa
Hawaii
Lobelia monostachya (ncn)

Lobelia monostachya
Honolulu
Lobelia niihauensis (ncn)

Lobelia niihauensis
Honolulu
Kauai

Lobelia oahuensis (ncn)
Lobelia oahuensis
Honolulu

Lysimachia filifolia (ncn)
Lysimachia filifolia
Honolulu

Kauai

Lysimachia lydgatei (ncn)
Lysimachia lydgatei
Honolulu
Maui
Lysimachia maxima (ncn)

Lysimachia maxima
Maui
Geranium multiflorum
Mahoe (Alectryon macrococcus)
Alectryon macrococcus
Honolulu
Kauai

Maui

Makou (Peucedanum sandwicense)
Peucedanum sandwicense

Honolulu

Kauai
Maui
Delissea undulata
Ma'o Hau Hele (Hibiscus

Hibiscus brackenridgei

Hawaii
koolauensis)
Honolulu

Maui

Dicot

Ma'oli'oli (Schiedea apokremnos)
Schiedea apokremnos
Kauai
Ma'oli'oli (Schiedea kealiae)
Schiedea kealiae

Honolulu
Mapele (Cyrtandra cyaneoides)
Cyrtandra cyaneoides

Kauai
Mehamehame (Flueggea
Flueggea neowawraea

Hawaii
Honolulu
Kauai

Maui
Munroidendron racemosum (ncn)
Munroidendron racemosum

Kauai
Na'ena'e (Dubautia herbstobatae)
Gopherus polyphemus

Honolulu

Na'ena'e (Dubautia plantaginea ssp. humilis)
Dubautia plantaginea ssp. humilis
Maui
Nani Wai'ale'ale (Viola kauaensis var. wahiawaensis)
Viola kauaiensis var. wahiawaensis
Kauai

Nanu (Gardenia mannii)
Gardenia mannii
Honolulu

Na'u (Gardenia brighamii)
Gardenia brighamii

Honolulu

Maui

Naupaka, Dwarf (Scaevola coriacea)
Scaevola coriacea
Maui

Nehe (Lipochaeta fauriei)

Lipochaeta fauriei
Kauai

Nehe (Lipochaeta kamolensis)
Lipochaeta kamolensis

Dicot

Maui
Nehe (Lipochaeta lobata var. leptophylla)
Lipochaeta lobata var. leptophylla
Honolulu

Nehe (Lipochaeta micrantha)
Lipochaeta micrantha
Kauai

Nehe (Lipochaeta tenuifolia)
Lipochaeta tenuifolia
Honolulu

Nehe (Lipochaeta waimeaensis)
Lipochaeta waimeaensis
Kauai

Neraudia angulata (ncn)
Neraudia angulata
Honolulu

Neraudia ovata (ncn)
Neraudia ovata
Hawaii

Neraudia sericea (ncn)
Neraudia sericea

Hawaii
Maui
Nioi (Eugenia koolauensis)
Eugenia koolauensis
Honolulu
Honolulu
Nohoanu (Geranium multiflorum)

Hawaii
Hawaii
Maui
'Oha (Delissea rivularis)
Delissea rivularis
Delissea rivularis
Kauai

'Oha (Delissea subcordata)
Delissea subcordata
Delissea subcordata
Honolulu
Honolulu
'Oha (Delissea undulata)

Hawaii
Hawaii

'Oha (Lobelia gaudichaudii

Lobelia gaudichaudii ssp.
Lobelia gaudichaudii ssp.
Honolulu

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Dicot

'Oha Wai (Clermontia
Clermontia drepanomorpha
Hawaii

'Oha Wai (Clermontia lindseyana)
Clermontia lindseyana
Hawaii
Maui

'Oha Wai (Clermontia oblongifolia ssp. brevipes)
Clermontia oblongifolia ssp. brevipes
Maui

'Oha Wai (Clermontia oblongifolia ssp. mauiensis)
Clermontia oblongifolia ssp.
Maui

'Oha Wai (Clermontia peleana)
Clermontia peleana
Hawaii

'Oha Wai (Clermontia pyrularia)
Clermontia pyrularia
Hawaii

'Oha Wai (Clermontia samuelii)
Clermontia samuelii
Maui

'Ohai (Sesbania tomentosa)
Sesbania tomentosa
Hawaii
Honolulu
Kauai
Maui

'Ohe'ohe (Tetraplasandra
Tetraplasandra gymnocarpa
Honolulu

'Olulu (Brighamia insignis)
Brighamia insignis
Kauai

Opuhe (Urera kaalae)
Urera kaalae
Honolulu

Pamakani (Viola chamissoniana ssp. chamissoniana)
Viola chamissoniana ssp. chamissoniana
Honolulu

Dicot

Phyllostegia hirsuta (ncn)
Phyllostegia hirsuta
Honolulu

Phyllostegia kaalaensis (ncn)
Phyllostegia kaalaensis
Honolulu

Phyllostegia knudsenii (ncn)
Phyllostegia knudsenii
Kauai

Phyllostegia mannii (ncn)
Phyllostegia mannii
Maui

Phyllostegia mollis (ncn)
Phyllostegia mollis
Honolulu
Maui

Phyllostegia parviflora (ncn)
Phyllostegia parviflora
Honolulu

Phyllostegia velutina (ncn)
Phyllostegia velutina
Hawaii

Phyllostegia waimeae (ncn)
Phyllostegia waimeae
Kauai

Phyllostegia warshaueri (ncn)
Phyllostegia warshaueri
Hawaii

Phyllostegia wawrana (ncn)
Phyllostegia wawrana
Kauai

Pilo (Hedyotis mannii)
Hedyotis mannii
Maui

Po'e (Portulaca sclerocarpa)
Portulaca sclerocarpa
Hawaii
Maui

Popolo 'Aiakeakua (Solanum sandwicense)
Solanum sandwicense
Honolulu
Kauai

Dicot

Popolo Ku Mai (Solanum
Solanum incompletum
Hawaii

Pua'ala (Brighamia rockii)
Brighamia rockii
Maui

Remya kauaiensis (ncn)
Remya kauaiensis
Kauai

Remya montgomeryi (ncn)
Remya montgomeryi
Kauai

Remya, Maui
Remya mauiensis
Maui

Sandalwood, Lanai (='Iliahi)
Santalum freycinetianum var.
Maui

Sanicula mariversa (ncn)
Sanicula mariversa
Honolulu

Sanicula purpurea (ncn)
Sanicula purpurea
Maui

Schiedea haleakalensis (ncn)
Schiedea haleakalensis
Maui

Schiedea helleri (ncn)
Schiedea helleri
Kauai

Schiedea hookeri (ncn)
Schiedea hookeri
Honolulu

Schiedea kaalae (ncn)
Schiedea kaalae
Honolulu

Schiedea kauaiensis (ncn)
Schiedea kauaiensis
Kauai

Schiedea lydgatei (ncn)
Schiedea lydgatei
Maui

Schiedea membranacea (ncn)
Schiedea membranacea

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Dicot

Kauai
Schiedea nuttallii (ncn)
Schiedea nuttallii

Honolulu
Kauai

Schiedea sarmentosa (ncn)
Schiedea sarmentosa
Maui

Schiedea spergulina var. leiopoda
Schiedea spergulina var. leiopoda
Kauai

Schiedea spergulina var. spergulina (ncn)
Schiedea spergulina var.
Kauai

Schiedea verticillata (ncn)
Schiedea verticillata
Honolulu

Schiedea, Diamond Head (Schiedea adamantis)
Schiedea adamantis
Honolulu

Silene alexandri (ncn)
Silene alexandri
Maui

Silene hawaiiensis (ncn)
Silene hawaiiensis
Hawaii

Silene lanceolata (ncn)
Silene lanceolata
Hawaii

Honolulu
Kauai
Maui

Silene perlmanii (ncn)
Silene perlmanii

Honolulu

Silversword, Haleakala ('Ahinahina) (ncn)
Argyroxiphium sandwicense ssp. macrocephalum

Hawaii
Maui

Silversword, Ka'u (Argyroxiphium kauense)
Argyroxiphium kauense

Dicot

Hawaii
Silversword, Mauna Kea
Argyroxiphium sandwicense ssp. sandwicense

Hawaii
Maui

Spermolepis hawaiiensis (ncn)
Spermolepis hawaiiensis
Hawaii

Honolulu
Kauai
Maui

Stenogyne angustifolia (ncn)
Stenogyne angustifolia var.
Hawaii

Stenogyne bifida (ncn)
Stenogyne bifida
Maui

Stenogyne campanulata (ncn)
Stenogyne campanulata
Kauai

Stenogyne kanehoana (ncn)
Stenogyne kanehoana
Honolulu

Tetramolopium arenarium (ncn)
Tetramolopium arenarium
Hawaii

Tetramolopium capillare (ncn)
Tetramolopium capillare
Maui

Tetramolopium filiforme (ncn)
Tetramolopium filiforme
Honolulu

Tetramolopium lepidotum ssp. lepidotum (ncn)
Tetramolopium lepidotum ssp. lepidotum

Honolulu

Tetramolopium remyi (ncn)
Tetramolopium remyi

Maui
Tetramolopium rockii (ncn)

Tetramolopium rockii
Maui

Dicot

Trematolobelia singularis (ncn)
Trematolobelia singularis
Honolulu

Uhiuhi (Caesalpinia kavaiensis)
Caesalpinia kavaiense
Hawaii
Hawaii
Honolulu
Maui

Ulihi (Phyllostegia glabra var. lanaiensis)
Phyllostegia glabra var. lanaiensis
Maui

Vetch, Hawaiian (Vicia menziesii)
Vicia menziesii
Hawaii

Vigna o-wahuensis (ncn)
Vigna o-wahuensis
Hawaii
Kauai
Maui
Viola helenae (ncn)
Viola helenae
Viola helenae
Kauai
Viola lanaiensis (ncn)
Viola lanaiensis
Viola lanaiensis
Maui
Viola oahuensis (ncn)
Viola oahuensis
Viola oahuensis
Honolulu
Wahine Noho Kula (Isodendrion pyrifolium)

Isodendrion pyrifolium
Hawaii
Xylosma crenatum (ncn)
Xylosma crenatum (ncn)
Xylosma crenatum
Kauai

Ferns

Asplenium fragile var. insulare

Asplenium fragile var. insulare

Hawaii

Diellia erecta (ncn)
Diellia erecta

Hawaii
Honolulu

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Ferns

Maui

Diellia falcata (ncn)
Diellia falcata

Honolulu

Diellia pallida (ncn)

Diellia pallida

Kauai

Diellia unisora (ncn)
Diellia unisora

Honolulu
Maui

Diplazium molokaiense (ncn)
Diplazium molokaiense

Maui

juddii)
Fern, Pendant Kihi (Adenophorus periens)
Adenophorus periens

Hawaii

Kauai
Maui

'Ihi'Ihi (Marsilea villosa)

Marsilea villosa

Honolulu
Maui

Pauoa (Ctenitis squamigera)
Ctenitis squamigera

Honolulu

Maui

Pteris lidgatei (ncn)
Pteris lidgatei

Honolulu

livida)

Maui

Wawae'Iole (Phlegmariurus (=Huperzia) mannii)

Huperzia mannii

Hawaii
Maui

Wawae'Iole (Phlegmariurus (=Lycopodium) nutans)
Lycopodium (=Phlegmariurus)

Honolulu

Gastropod

Gastropod

Snail, O'ahu Tree (Achatinella abbreviata)

Achatinella abbreviata

Honolulu

Snail, O'ahu Tree (Achatinella apexfulva)
Achatinella apexfulva

Honolulu

Snail, O'ahu Tree (Achatinella
Achatinella bellula

Honolulu

Snail, O'ahu Tree (Achatinella
Achatinella buddii

Honolulu

Snail, O'ahu Tree (Achatinella

bulimoides)
Achatinella bulimoides

Honolulu

Snail, O'ahu Tree (Achatinella
Achatinella byronii

Honolulu

Snail, O'ahu Tree (Achatinella

Achatinella caesia

Honolulu

Snail, O'ahu Tree (Achatinella
Achatinella casta

Honolulu

Snail, O'ahu Tree (Achatinella
Achatinella cestus

Honolulu

Snail, O'ahu Tree (Achatinella concavospira)

Achatinella concavospira

Honolulu

Snail, O'ahu Tree (Achatinella curta)

Achatinella curta

Honolulu

Snail, O'ahu Tree (Achatinella decipiens)
Achatinella decipiens

Honolulu

Snail, O'ahu Tree (Achatinella

Gastropod

Snail, O'ahu Tree (Achatinella dimorpha)

Achatinella dimorpha

Honolulu

Snail, O'ahu Tree (Achatinella
Achatinella elegans
Achatinella elegans

Honolulu

Snail, O'ahu Tree (Achatinella
Achatinella fulgens

Honolulu

Snail, O'ahu Tree (Achatinella fuscobasis)
Achatinella fuscobasis

Honolulu

Snail, O'ahu Tree (Achatinella

Achatinella juddii

Honolulu
Honolulu

Snail, O'ahu Tree (Achatinella
Achatinella juncea
Achatinella juncea

Honolulu

Snail, O'ahu Tree (Achatinella lehuiensis)

Achatinella lehuiensis

Honolulu

Snail, O'ahu Tree (Achatinella leucorraphe)
Achatinella leucorraphe
Achatinella leucorraphe

Honolulu

Snail, O'ahu Tree (Achatinella lila)
Achatinella lila

Honolulu

Snail, O'ahu Tree (Achatinella

Achatinella livida

Honolulu

Snail, O'ahu Tree (Achatinella

Achatinella lorata

Honolulu

Snail, O'ahu Tree (Achatinella mustelina)
Achatinella mustelina

Honolulu

Snail, O'ahu Tree (Achatinella

Snail, Newcomb's
Erinna newcombi
Kauai

Achatinella decora
Honolulu

papyracea)
Achatinella papyracea
Honolulu

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Gastropod

Snail, O'ahu Tree (Achatinella phaeozona)
Achatinella phaeozona

Honolulu

Snail, O'ahu Tree (Achatinella pulcherrima)

Achatinella pulcherrima

Honolulu

Snail, O'ahu Tree (Achatinella

pupukanioe)

Achatinella pupukanioe

Honolulu

Snail, O'ahu Tree (Achatinella
Achatinella rosea

Honolulu

Snail, O'ahu Tree (Achatinella sowerbyana)
Achatinella sowerbyana

Honolulu

Snail, O'ahu Tree (Achatinella spaldingi)

Achatinella spaldingi

Honolulu

Snail, O'ahu Tree (Achatinella
Achatinella stewartii

Honolulu

Snail, O'ahu Tree (Achatinella swiftii)

Achatinella swiftii

Honolulu

Snail, O'ahu Tree (Achatinella taeniolata)
Achatinella taeniolata

Honolulu

Platanthera holochila

Snail, O'ahu Tree (Achatinella thaanumi)
Achatinella thaanumi

Honolulu

Snail, O'ahu Tree (Achatinella
Achatinella turgida

Honolulu

Snail, O'ahu Tree (Achatinella
Achatinella valida

Honolulu

Insect

Moth, Blackburn's Sphinx

Manduca blackburni

Insect

Hawaii
Maui

Mammal

Bat, Hawaiian Hoary
Lasiurus cinereus semotus
Lasiurus cinereus semotus

Hawaii

Honolulu
Kauai

Maui

Monocot

Bluegrass, Hawaiian
Poa sandvicensis

Kauai

Bluegrass, Mann's (Poa mannii)
Poa mannii

Kauai

Gahnia Lanaiensis (ncn)
Gahnia lanaiensis

Maui

Grass, Fosberg's Love
Eragrostis fosbergii

Honolulu

Hala Pepe (Pleomele hawaiiensis)
Pleomele hawaiiensis

Hawaii

Hilo Ischaemum (Ischaemum byrone)

Ischaemum byrone

Hawaii
Kauai
Maui

Kamanomano (Cenchrus

agrimonioides)
Cenchrus agrimonioides

Honolulu
Maui

Lau'ehu (Panicum niihauense)
Panicum niihauense

Kauai

Lo`ulu (Pritchardia affinis)
Pritchardia affinis

Hawaii

Lo`ulu (Pritchardia kaalae)
Pritchardia kaalae

Honolulu

Monocot

Lo`ulu (Pritchardia munroi)
Pritchardia munroi

Maui

Maui

Lo`ulu (Pritchardia napaliensis)
Pritchardia napaliensis
Pritchardia napaliensis

Kauai

Lo`ulu (Pritchardia remota)
Pritchardia remota

Honolulu

Lo`ulu (Pritchardia schattaueri)
Pritchardia schattaueri

Hawaii

Lo`ulu (Pritchardia viscosa)
Pritchardia viscosa

Kauai

Mariscus fauriei (ncn)
Mariscus fauriei

Hawaii
Maui
Maui

Mariscus pennatiformis (ncn)
Mariscus pennatiformis

Hawaii
Honolulu
Kauai
Maui

Panicgrass, Carter's (Panicum fauriei var.carteri)
Panicum fauriei var. carteri

Honolulu
Maui

Platanthera holochila (ncn)

Kauai
Maui

Poa siphonoglossa (ncn)
Poa siphonoglossa

Kauai

Pu'uka'a (Cyperus trachysanthos)
Cyperus trachysanthos

Honolulu
Kauai

Wahane (Pritchardia aylmer-
Pritchardia aylmer-robinsonii

Kauai

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Reptile

Sea turtle, green
Chelonia mydas
Hawaii
Honolulu
Kauai
Maui

Sea turtle, hawksbill
Eretmochelys imbricata
Hawaii
Honolulu
Kauai
Maui

Idaho

Dicot

Catchfly, Spalding's
Silene spaldingii

Nez Perce

Howellia, Water
Howellia aquatilis

Kootenai

Latah

Mammal

Bear, Grizzly
Ursus arctos horribilis
Bonner
Boundary

Caribou, Woodland

Rangifer tarandus caribou

Bonner

Boundary

Wolf, Gray
Canis lupus

Benewah
Bonner
Boundary
Kootenai

Illinois

Bird

Tern, Interior (population) Least
Sterna antillarum
Alexander
Madison

Bird

Wabash

Bivalve

Fanshell
Cyprogenia stegaria
Whiteside

Mucket, Pink (Pearlymussel)
Lampsilis abrupta
Alexander

Pearlymussel, Fat Pocketbook
Potamilus capax
Pike
Wabash
Whiteside

Pearlymussel, Higgins' Eye
Lampsilis higginsii
Henderson

Jo Daviess

Mercer
Pike

Whiteside

Pearlymussel, Orange-footed
Plethobasus cooperianus
Alexander

Pearlymussel, White Wartyback
Plethobasus cicatricosus
Clark

Crustacean

Amphipod, Illinois Cave

Gammarus acherondytes

Monroe

Dicot

Aster, Decurrent False
Boltonia decurrens

Alexander
Brown
Calhoun
Greene
Jersey
Madison
Marshall
Monroe
Morgan
Pike

Dicot

Woodford

Clover, Leafy Prairie
Dalea foliosa
Will
Williamson

Clover, Prairie Bush
Lespedeza leptostachya
McHenry
Ogle
Winnebago

Daisy, Lakeside
Hymenoxys herbacea
Will

Milkweed, Mead's
Asclepias meadii
Saline
Will
Will

Gastropod

Gastropod

Snail, Iowa Pleistocene

Discus macclintocki

Jo Daviess

Insect

Dragonfly, Hine's Emerald
Somatochlora hineana
Will

Mammal

Bat, Gray
Bat, Gray
Myotis grisescens
Myotis grisescens
Alexander
Alexander
Madison
Madison
Pike

Bat, Indiana
Myotis sodalis

Alexander
Bond
Brown
Calhoun
Christian
Clark
Clinton
Franklin
Greene
Henderson

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Mammal

Jersey
Jo Daviess
Madison
Marion
Marshall
Mercer
Monroe
Morgan
Ogle
Pike
Saline
Sangamon
Stephenson
Wabash
Warren
Washington
Wayne
Whiteside
Williamson
Winnebago

Woodford

Monocot

Orchid, Eastern Prairie Fringed
Platanthera leucophaea
McHenry

Indiana

Bird

Plover, Piping
Charadrius melodus
Porter

Bivalve

Fanshell

Cyprogenia stegaria

Carroll
Daviess

Lawrence

Mucket, Pink (Pearlymussel)

Lampsilis abrupta
Clark
Dearborn
Harrison
Jefferson
Warrick

Bivalve

Mussel, Clubshell
Pleurobema clava
Carroll
Mussel, Ring Pink (=Golf Stick
Obovaria retusa
Harrison
Mussel, Rough Pigtoe
Pleurobema plenum
Carroll
Pearlymussel, Fat Pocketbook
Potamilus capax
Carroll
Pearlymussel, Tubercled-blossom
Epioblasma torulosa torulosa
Carroll
Pearlymussel, White Cat's Paw
Epioblasma obliquata perobliqua
Allen

Dicot

Clover, Running Buffalo
Trifolium stoloniferum
Dearborn
Goldenrod, Short's
Solidago shortii
Harrison

Thistle, Pitcher's
Cirsium pitcheri

Porter

Insect

Butterfly, Karner Blue
Lycaeides melissa samuelis

Porter

Butterfly, Mitchell's Satyr

Neonympha mitchellii mitchellii
Lagrange

Mammal

Bat, Gray

Myotis grisescens

Clark
Harrison
Jennings
Bat, Indiana
Myotis sodalis

Mammal

Allen
Boone
Carroll
Clark
Clay
Daviess
Dearborn
Elkhart
Greene
Hancock
Harrison
Huntington
Jefferson
Jennings
Johnson
Lagrange
Lawrence
Morgan
Orange
Owen

Porter
Putnam
Scott
Starke
Warrick
Washington

Iowa

Bird

Plover, Piping
Plover, Piping
Charadrius melodus
Polk
Polk

Bivalve

Pearlymussel, Fat Pocketbook
Pearlymussel, Fat Pocketbook
Potamilus capax
Potamilus capax
Des Moines
Pearlymussel, Higgins' Eye
Pearlymussel, Higgins' Eye
Lampsilis higginsii

Allamakee
Allamakee
Clinton
Des Moines
Dubuque
Jackson
Lee

Bivalve

Louisa
Scott

Dicot

Clover, Prairie Bush
Lespedeza leptostachya

Allamakee
Bremer
Butler
Cedar
Cerro Gordo
Clinton
Decatur
Des Moines
Dubuque
Greene
Hamilton
Hardin
Harrison
Howard
Jackson
Jones
Lee
Louisa
Lucas
Mills
Polk
Ringgold
Scott
Shelby
Tama
Van Buren
Winneshiek

Milkweed, Mead's
Asclepias meadii

Decatur
Lucas
Ringgold

Monkshood, Northern Wild
Aconitum noveboracense

Allamakee
Dubuque
Hardin
Jackson

Ferns

Fern, American hart's-tongue
Asplenium scolopendrium var. americanum

Cerro Gordo

Gastropod

Snail, Iowa Pleistocene
Discus macclintocki

Clinton
Dubuque
Jackson
Winneshiek

Mammal

Bat, Indiana
Myotis sodalis

Cedar
Decatur
Des Moines
Dubuque
Harrison
Lee
Louisa
Lucas
Mills
Polk
Ringgold
Scott
Van Buren

Monocot

Orchid, Eastern Prairie Fringed
Platanthera leucophaea

Cedar
Decatur
Des Moines
Jackson
Jones
Lee
Louisa
Lucas
Scott
Van Buren

Orchid, Western Prairie Fringed
Platanthera praeclara

Bremer
Butler

Monocot

Cedar
Cerro Gordo
Clinton
Decatur
Decatur
Des Moines
Dubuque
Greene
Hamilton
Hardin
Harrison
Howard
Jackson
Lee
Linn
Louisa
Lucas
Mills
Polk
Ringgold
Scott
Shelby
Tama
Van Buren

Kansas

Bird

Crane, Whooping
Grus americana

Cowley
Douglas
Ford
Harvey
Jefferson
Marion
McPherson
Osage
Reno
Rice
Riley
Sedgwick
Shawnee
Stafford
Sumner
Wabaunsee

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Bird

Plover, Piping
Charadrius melodus
Cowley
Ford
Reno
Rice
Sedgwick
Stafford
Sumner

Tern, Interior (population) Least
Sterna antillarum
Cowley
Ford
Reno
Rice
Sedgwick
Stafford
Sumner

Dicot

Milkweed, Mead's
Asclepias meadii
Allen
Anderson
Bourbon
Crawford
Douglas
Franklin
Jefferson
Linn
Miami
Neosho

Insect

Beetle, American Burying
Nicrophorus americanus
Doniphan
Douglas
Montgomery
Riley

Mammal

Bat, Gray
Myotis grisescens
Bourbon
Cherokee

Mammal

Crawford
Labette

Ferret, Black-footed
Mustela nigripes
Ford
Sedgwick

Monocot

Orchid, Western Prairie Fringed
Platanthera praeclara
Anderson
Atchison
Crawford
Douglas
Franklin
Jackson
Jefferson
Lyon
Osage
Riley
Shawnee

Kentucky

Bird

Plover, Piping
Charadrius melodus
Jefferson

Tern, Interior (population) Least
Sterna antillarum
Ballard
Fulton
Hickman
Jefferson
McCracken

Warbler (=Wood), Kirtland's
Dendroica kirtlandii
Warren

Warbler, Bachman's
Vermivora bachmanii
Logan
Warren

Woodpecker, Ivory-billed
Campephilus principalis
Ballard
Fulton

Bird

Lincoln

Woodpecker, Red-cockaded
Picoides borealis
Laurel
Pulaski
Wayne

Bivalve

Fanshell
Cyprogenia stegaria
Allen
Bath
Fleming
Henderson
Jefferson
Nicholas
Owen
Pendleton
Spencer
Todd
Warren
Wayne

Mucket, Pink (Pearlymussel)
Lampsilis abrupta
Ballard
Bath
Boone
Henderson
Jefferson
Marshall
McCracken
Pendleton
Pulaski
Spencer
Spencer
Warren
Wayne
Wayne

Mussel, Clubshell
Pleurobema clava
Allen
Bath
Grayson
Jefferson
Marshall
Owen
Pendleton

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Bivalve

Pulaski
Spencer
Warren

Mussel, Cumberland Combshell
Epioblasma brevidens
Laurel
Pulaski
Wayne

Mussel, Cumberland Elktoe
Alasmidonta atropurpurea
Laurel

Mussel, Oyster
Epioblasma capsaeformis
Laurel
Pulaski
Wayne

Mussel, Ring Pink (=Golf Stick
Obovaria retusa
Ballard
Boone
Henderson
Jefferson
Marshall
McCracken
Pulaski
Todd
Warren
Wayne

Mussel, Rough Pigtoe
Pleurobema plenum
Marshall
Pendleton
Pulaski
Warren
Wayne

Mussel, Winged Mapleleaf
Quadrula fragosa
Oldham
Pendleton

Pearlymussel, Appalachian
Quadrula sparsa
Pulaski

Pearlymussel, Cracking
Hemistena lata

Bivalve

Jefferson
Pulaski
Wayne

Pearlymussel, Cumberland Bean
Villosa trabalis
Jackson
Laurel
Lincoln
Pulaski
Wayne

Pearlymussel, Dromedary
Dromus dromas
Pulaski
Wayne

Pearlymussel, Fat Pocketbook
Potamilus capax
Crittenden
Henderson
Jefferson
Marshall
McCracken
Warren

Pearlymussel, Little-wing
Pegias fabula
Jackson
Laurel
Logan
Pulaski
Todd
Wayne

Pearlymussel, Orange-footed
Plethobasus cooperianus
Ballard
Crittenden
Grayson
Hancock
Jefferson
Marshall
McCracken
Warren
Wayne

Pearlymussel, Purple Cat's Paw
Epioblasma obliquata obliquata
Henderson

Bivalve

Pulaski
Warren

Pearlymussel, Tubercled-blossom
Epioblasma torulosa torulosa
Henderson
McCracken
Pendleton
Warren

Pearlymussel, White Wartyback
Plethobasus cicatricosus
Henderson
Marshall
Todd

Pearlymussel, Yellow-blossom
Epioblasma florentina florentina
Pulaski
Todd

Riffleshell, Northern
Epioblasma torulosa rangiana
Bath
Grayson
Pendleton
Spencer
Warren

Riffleshell, Tan
Epioblasma florentina walkeri (=E. walkeri)
Laurel
Logan
Pulaski
Wayne

Dicot

Clover, Running Buffalo
Trifolium stoloniferum
Boone
Bourbon
Fayette
Jefferson

Goldenrod, Short's
Solidago shortii
Fleming
Jefferson
Nicholas

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Dicot

Potato-bean, Price's
Apios priceana
Warren

Rock-cress, Large (=Braun's)
Arabis perstellata E. L. Braun var. ampla Rollins

Owen

Rock-cress, Small
Arabis perstellata E. L. Braun var. perstellata Fernald

Owen

Spiraea, Virginia

Spiraea virginiana

Laurel

Pulaski

Insect

Beetle, American Burying
Nicrophorus americanus
Henderson
Jefferson

Mammal

Bat, Gray
Myotis grisescens
Allen
Caldwell
Christian
Crittenden
Fayette
Graves
Grayson
Hardin
Hopkins
Jefferson
Logan
Pulaski
Todd
Warren
Wayne

Bat, Indiana

Myotis sodalis
Allen
Anderson
Ballard

Bath

Mammal

Boone
Bourbon
Caldwell
Christian
Clay

Crittenden
Daviess
Fayette
Fleming
Fleming
Fulton

Graves

Grayson

Hancock

Hardin

Henderson
Hickman
Hopkins
Jackson
Jefferson
Knox
Laurel
Lincoln
Logan
Marshall
McCracken
Nicholas
Oldham
Owen
Pendleton
Pulaski
Shelby
Spencer
Todd
Warren
Wayne

Bat, Virginia Big-eared
Corynorhinus (=Plecotus) townsendii virginianus

Jackson

Louisiana

Bird

Pelican, Brown
Pelecanus occidentalis

Cameron

Bird

Iberia
Jefferson
LaFourche
Orleans
Plaquemines

St. Mary
St. Tammany
Tangipahoa
Terrebonne
Terrebonne
Vermilion

Plover, Piping
Charadrius melodus
Charadrius melodus

Cameron

Iberia

Jefferson
LaFourche
Plaquemines
St. Mary
Terrebonne
Vermilion

Tern, California Least
Sterna antillarum browni
Madison

Tern, Interior (population) Least
Sterna antillarum
Bossier
Caddo
Concordia
East Carroll
Red River
Tensas

Woodpecker, Red-cockaded
Picoides borealis
Beauregard
Bossier
Calcasieu
De Soto

Evangeline

Grant
Jackson
La Salle
Livingston
Morehouse
Morehouse
Natchitoches

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Bird

Ouachita
Rapides
Red River
St. Tammany
Tangipahoa
Webster
Winn

Bivalve

Mucket, Pink (Pearlymussel)
Lampsilis abrupta
Morehouse

Mussel, Heelsplitter Inflated
Potamilus inflatus
Ascension
East Baton Rouge
Livingston

Pearlshell, Louisiana
Margaritifera hembeli
Grant
Rapides

Dicot

Fruit, Earth (=geocarpon)
Geocarpon minimum
Winn

Ferns

Quillwort, Louisiana
Isoetes louisianensis
St. Tammany
Washington

Mammal

Bear, Louisiana Black
Ursus americanus luteolus
Avoyelles
Catahoula
Concordia
East Carroll
Franklin
Grant
Iberia
Iberville
Madison
Pointe Coupee
Richland

Mammal

St. Landry
St. Martin
St. Mary
St. Tammany
Tensas
Vermilion
Washington
West Carroll
West Feliciana

Reptile

Sea turtle, green
Chelonia mydas
Cameron
Jefferson
LaFourche
Plaquemines
St. Mary
Terrebonne
Vermilion

Sea turtle, hawksbill
Eretmochelys imbricata
Cameron
Iberia
Jefferson
LaFourche
Plaquemines
St. Mary
Terrebonne
Vermilion

Sea turtle, Kemp's ridley
Lepidochelys kempii
Cameron
Iberia
Jefferson
LaFourche
Plaquemines
St. Mary
Terrebonne
Vermilion

Sea turtle, leatherback
Dermochelys coriacea
Cameron
Iberia
Jefferson

Reptile

LaFourche
Plaquemines
St. Mary
Terrebonne
Vermilion

Sea turtle, loggerhead
Caretta caretta
Cameron
Iberia
Jefferson
LaFourche
Plaquemines
St. Mary
Terrebonne
Vermilion

Tortoise, Gopher
Gopherus polyphemus
St. Tammany
Tangipahoa
Washington

Turtle, Ringed Sawback
Graptemys oculifera
St. Tammany
Washington

Maine

Bird

Plover, Piping
Plover, Piping
Charadrius melodus
Charadrius melodus
Sagadahoc
York
York

Tern, Roseate
Sterna dougallii dougallii
Sagadahoc
York

Monocot

Pogonia, Small Whorled
Isotria medeoloides
Oxford
York
York

Maryland

Dicot

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Dicot

Harperella
Ptilimnium nodosum
Allegany

Insect

Beetle, Northeastern Beach Tiger

Cicindela dorsalis dorsalis
Calvert

Beetle, Puritan Tiger

Cicindela puritana

Calvert

Mammal

Bat, Indiana
Myotis sodalis
Allegany
Frederick
Harford

Howard
Montgomery

Reptile

Turtle, Bog (Northern population)
Clemmys muhlenbergii

Harford

Massachusetts

Bird

Plover, Piping
Charadrius melodus
Barnstable
Bristol

Starling, Ponape Mountain
Aplonis pelzelni
Worcester

Tern, Roseate
Sterna dougallii dougallii

Water
Barnstable
Bristol

Dicot

Gerardia, Sandplain
Agalinis acuta

Barnstable

Monocot

Monocot

Franklin

Pogonia, Small Whorled
Isotria medeoloides
Worcester

Michigan

Bird

Plover, Piping

Charadrius melodus

Charlevoix

Leelanau

Mason

Warbler (=Wood), Kirtland's
Dendroica kirtlandii
Alcona
Oscoda

Bivalve

Mussel, Clubshell
Pleurobema clava

Hillsdale

Dicot

Goldenrod, Houghton's
Solidago houghtonii
Charlevoix

Monkey-flower, Michigan
Mimulus glabratus var.

Charlevoix
Leelanau

Thistle, Pitcher's
Cirsium pitcheri

Alcona
Charlevoix
Leelanau
Mason

Ottawa
Van Buren

Insect

Butterfly, Karner Blue
Lycaeides melissa samuelis

Mason
Newaygo

Insect

Jackson
Van Buren

Mammal

Bat, Indiana
Myotis sodalis

Branch
Branch
Clinton
Eaton
Eaton

Genesee
Gratiot
Gratiot
Hillsdale
Hillsdale
Ingham
Jackson
Jackson
Leelanau
Livingston
Mason
Ottawa
Ottawa
Shiawassee
Tuscola
Tuscola
Van Buren

Monocot

Monocot

Iris, Dwarf Lake
Iris lacustris
Charlevoix

Orchid, Eastern Prairie Fringed
Platanthera leucophaea
Platanthera leucophaea
Clinton
Eaton
Genesee
Gratiot
Gratiot
Livingston
Tuscola

Reptile

Snake, Northern Copperbelly

Nerodia erythrogaster neglecta
Branch
Eaton
Hillsdale

Minnesota

Bivalve

Bulrush, Northeastern (=Barbed

Scirpus ancistrochaetus

Butterfly, Mitchell's Satyr

Neonympha mitchellii mitchellii

Branch

Pearlymussel, Higgins' Eye
Lampsilis higginsii
Lampsilis higginsii

Wabasha

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Dicot

Clover, Prairie Bush
Lespedeza leptostachya
Jackson
Mower
Renville
Rice

Roseroot, Leedy's
Sedum integrifolium ssp. leedyi
Fillmore

Mammal

Wolf, Gray
Canis lupus
Otter Tail
Todd

Monocot

Lily, Minnesota Trout
Erythronium propullans
Rice

Orchid, Western Prairie Fringed
Platanthera praeclara
Fillmore
Mower

Mississippi

Amphibian

Frog, Dusky Gopher (Mississippi
Rana capito sevosa
Harrison

Bird

Crane, Mississippi Sandhill
Grus canadensis pulla
Jackson

Pelican, Brown
Pelecanus occidentalis
Hancock
Harrison
Jackson

Bird

Tern, Interior (population) Least
Sterna antillarum
Bolivar
Coahoma
De Soto
Issaquena
Tunica
Warren
Washington

Woodpecker, Red-cockaded
Picoides borealis
Amite
Forrest
Franklin
George
Greene
Harrison
Jackson
Jasper
Jones
Noxubee
Oktibbeha
Perry
Scott
Smith
Stone
Wayne
Wilkinson
Winston
Yalobusha

Bivalve

Combshell, Southern (=Penitent mussel)
Epioblasma penita
Itawamba
Lowndes
Monroe

Mucket, Orangenacre

Bivalve

Lowndes
Monroe

Mussel, Black (=Curtus' Mussel)
Clubshell
Pleurobema curtum
Itawamba
Monroe

Mussel, Heavy Pigtoe (=Judge Tait's Mussel)
Pleurobema taitianum
Itawamba
Lowndes
Monroe

Mussel, Heelsplitter Inflated
Potamilus inflatus
Hancock
Pearl River
Pearl River

Mussel, Ovate Clubshell
Pleurobema perovatum
Pleurobema perovatum
Itawamba
Itawamba
Lowndes
Lowndes
Monroe
Monroe

Mussel, Southern Clubshell
Mussel, Southern Clubshell
Pleurobema decisum
Clay
Itawamba
Lowndes
Monroe

Pearlymussel, Fat Pocketbook
Potamilus capax
Jefferson

Dicot

Dicot

Pondberry
Lindera melissifolia
Bolivar
Bolivar
Sharkey
Sunflower
Tallahatchie
Tallahatchie

Plover, Piping
Charadrius melodus

Hancock
Harrison
Jackson

Lampsilis perovalis

Itawamba
Lowndes
Monroe

Mussel, Alabama Moccasinshell
Medionidus acutissimus

Potato-bean, Price's
Apios priceana
Apios priceana

Chickasaw
Clay
Kemper
Kemper
Oktibbeha

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Ferns

Quillwort, Louisiana
Isoetes louisianensis
Forrest
George
Greene
Hancock
Harrison
Jackson
Jones
Pearl River
Perry
Stone
Wayne

Mammal

Bat, Gray
Myotis grisescens
Perry
Wayne

Bear, Louisiana Black
Ursus americanus luteolus
Adams
Amite
Attala
Claiborne
Clarke
Copiah
Forrest
Franklin
George
Greene
Hancock
Harrison
Hinds
Holmes
Humphreys
Issaquena
Jackson
Jasper
Jefferson
Jefferson Davis
Jones
Lamar
Lauderdale
Lawrence

Mammal

Lowndes
Madison
Marion
Neshoba
Newton
Pearl River
Perry
Pike
Rankin
Scott
Sharkey
Simpson
Smith
Stone
Tunica
Warren
Washington
Wayne
Wilkinson
Yazoo

Reptile

Sea turtle, green
Chelonia mydas
Hancock
Harrison

Sea turtle, Kemp's ridley
Lepidochelys kempii
Hancock
Harrison
Jackson

Sea turtle, loggerhead
Caretta caretta
Hancock
Harrison
Jackson

Snake, Eastern Indigo
Drymarchon corais couperi
Forrest
George
Greene
Harrison
Jackson
Jones
Marion

Reptile

Perry
Stone
Wayne

Tortoise, Gopher
Gopherus polyphemus
Forrest
George
Greene
Hancock
Harrison
Jackson
Jones
Lamar
Marion
Pearl River
Pearl River
Perry
Stone
Wayne

Turtle, Ringed Sawback
Turtle, Ringed Sawback
Graptemys oculifera
Copiah
Hinds
Lawrence
Madison
Marion
Neshoba
Pearl River
Rankin
Scott
Simpson

Turtle, Yellow-blotched Map
Graptemys flavimaculata
Clarke
Forrest
George
Greene
Jackson
Jones
Perry
Stone
Wayne

Missouri

Bird

US EPA ARCHIVE DOCUMENT

Bird

Plover, Piping
Charadrius melodus
Buchanan
Polk
Tern, Interior (population) Least
Sterna antillarum
Chariton
Perry

Bivalve

Mucket, Pink (Pearlymussel)
Lampsilis abrupta
Butler
Cedar
Cole
Franklin
Gasconade
Jefferson
Miller
Osage
St. Clair
St. Louis
Wayne

Mussel, Scaleshell
Leptodea leptodon
Crawford
Franklin
Gasconade
Jefferson
La clede
Osage
Pulaski
St. Louis
Wright
Mussel, Winged Mapleleaf
Quadrula fragosa
Franklin
Pearlymussel, Curtis'
Epioblasma florentina curtisii
Bollinger
Butler
Wayne
Pearlymussel, Fat Pocketbook
Potamilus capax
Dunklin

Bivalve

Lewis
Pike

Crustacean

Crayfish, Cave (Cambarus
Cambarus aculabrum
Benton

Dicot

Aster, Decurrent False
Boltonia decurrens

Dunklin
Franklin
Howell
Pike
St. Charles
Bladderpod, Missouri
Lesquerella filiformis
Christian
Dade
Greene
Lawrence
Clover, Running Buffalo
Trifolium stoloniferum

Barry
Benton
Boone
Callaway
Carter
Cedar
Christian
Cole
Crawford
Dade
Dent
Dunklin
Howard
La clede
Madison
Moniteau
Ozark
Phelps
St. Charles
St. Louis
Texas
Vernon

Dicot

Wayne
Fruit, Earth (=geocarpon)
Geocarpon minimum
Cedar
Dade
Greene
Henry
Lawrence

Polk
St. Clair

Milkweed, Mead's
Asclepias meadii
Adair
Barton
Benton
Cass
Cedar
Dade
Harrison
Henry
Iron
Pettis
Polk

Reynolds
St. Clair
Vernon
Pondberry
Lindera melissifolia
Butler
Sneezeweed, Virginia
Helenium virginicum
Howell
Shannon

Insect

Beetle, American Burying
Nicrophorus americanus
Bollinger
Boone
Franklin
Howard
Jefferson
Newton
St. Louis
Wayne

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Insect

Dragonfly, Hine's Emerald
Somatochlora hineana
Dent
Iron
Phelps
Reynolds
Shannon
Wayne

Mammal

Bat, Gray
Myotis grisescens
Barry
Benton
Boone
Camden
Carter
Christian
Cole
Crawford
Dade
Dallas
Dent
Douglas
Franklin
Greene
Iron
Jasper
Jefferson
La clede
Lawrence
McDonald
Miller
Morgan
Newton
Oregon
Osage
Ozark
Phelps
Pike
Pulaski
Reynolds
Shannon
St. Clair
St. Louis

Mammal

Stone
Texas
Washington
Wright
Bat, Indiana
Myotis sodalis
Adair
Audrain
Barry
Boone
Buchanan
Caldwell
Callaway
Camden
Carroll
Chariton
Christian
Clay
Clinton
Cooper
Crawford
Daviess
De Kalb
Franklin
Gentry
Grundy
Harrison
Henry
Howard
Iron
Jefferson
La clede
Lewis
Linn
Livingston
Macon
Montgomery
Oregon
Phelps
Pike
Pulaski
Randolph
Ray
Schuyler

Mammal

Scotland
Shannon
St. Charles
St. Francois
St. Louis
Stone
Texas
Warren
Washington
Wright

Monocot

Orchid, Western Prairie Fringed
Platanthera praeclara
Harrison

Montana

Dicot

Howellia, Water
Howellia aquatilis
Missoula

Mammal

Bear, Grizzly
Ursus arctos horribilis
Carbon
Missoula
Ferret, Black-footed
Mustela nigripes
Custer

Wolf, Gray
Canis lupus
Carbon
Missoula

Nebraska

Bird

Crane, Whooping
Grus americana
Brown
Holt
Plover, Piping
Charadrius melodus
Brown
Cass
Holt

US EPA ARCHIVE DOCUMENT

Bird

Sarpy

Tern, Interior (population) Least
Sterna antillarum

Brown

Cass
Holt
Sarpy

Insect

Beetle, Salt Creek Tiger
Cicindela nevadica lincolniana

Lancaster

Monocot

Orchid, Western Prairie Fringed
Platanthera praeclara

Lancaster

Nevada

Bird

Flycatcher, Southwestern Willow
Empidonax traillii extimus

Clark

Rail, Yuma Clapper
Rallus longirostris yumanensis

Clark

Dicot

Blazing Star, Ash Meadows

Mentzelia leucophylla

Nye

Centaury, Spring-loving

Centaurium namophilum

Nye

Gumplant, Ash Meadows

Grindelia fraxino-pratensis

Nye

Ivesia, Ash Meadows

Ivesia kingii var. eremica

Nye

Milk-vetch, Ash Meadows
Astragalus phoenix

Nye

Niterwort, Amargosa
Nitrophila mohavensis

Dicot

Sunray, Ash Meadows
Enceliopsis nudicaulis var. corrugata

Nye

Insect

Naucorid, Ash Meadows
Ambrysus amargosus

Nye

Monocot

Ladies'-tresses, Ute
Spiranthes diluvialis

Lincoln

Reptile

Tortoise, Desert
Gopherus agassizii

Clark

Lincoln

Nye

New Hampshire

Monocot

Pogonia, Small Whorled

Isotria medeoloides

Rockingham

New Jersey

Dicot

Joint-vetch, Sensitive
Aeschynomene virginica

Cumberland

Mammal

Bat, Indiana

Myotis sodalis

Hunterdon

Mercer

Middlesex

Monocot

Pink, Swamp
Helonias bullata

Cumberland

Middlesex

Reptile

Reptile

Hunterdon

New Mexico

Amphibian

Frog, Chiricahua Leopard
Rana chiricahuensis

Hidalgo

Luna

Sierra

Bird

Bird

Crane, Whooping
Grus americana

Bernalillo

Quay

Quay

Rio Arriba

Sandoval

Sierra

Taos

Valencia

Falcon, Northern Aplomado
Falco femoralis septentrionalis

Chaves

Dona Ana

Eddy

Hidalgo

Hidalgo

Lea

Lincoln

Luna

Otero

Sierra

Flycatcher, Southwestern Willow
Empidonax traillii extimus

Bernalillo

Colfax

Dona Ana

Hidalgo

Luna

Otero

Rio Arriba

Sandoval

Sierra

Taos

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Bird

Owl, Mexican Spotted
Strix occidentalis lucida
Bernalillo
Chaves
Colfax
Dona Ana
Eddy
Hidalgo
Lincoln
Otero
Rio Arriba
Sandoval
Sierra
Taos
Torrance
Valencia

Plover, Piping
Charadrius melodus
Colfax

Tern, Interior (population) Least
Sterna antillarum
Chaves
Curry
De Baca
Dona Ana
Eddy
Otero
Quay
Rio Arriba

Crustacean

Amphipod, Noel's
Gammarus desperatus
Chaves

Dicot

Cactus, Kuenzler Hedgehog
Echinocereus fendleri var.
Chaves
Eddy
Lincoln

Otero

Cactus, Lee Pincushion
Coryphantha sneedii var. leei
Eddy

Dicot

Cactus, Sneed Pincushion
Coryphantha sneedii var. sneedii
Dona Ana
Eddy

Pennyroyal, Todsen's
Hedeoma todsenii
Otero
Sierra

Poppy, Sacramento Prickly
Argemone pleiacantha ssp. pinnatisecta
Otero

Sunflower, Pecos
Helianthus paradoxus
Chaves
Valencia

Thistle, Sacramento Mountains
Cirsium vinaceum
Otero

Wild-buckwheat, Gypsum
Eriogonum gypsophilum
Eddy

Gastropod

Snail, Pecos Assiminea
Assiminea pecos
Chaves

Springsnail, Koster's
Juturnia kosteri
Chaves

Springsnail, Roswell
Pyrgulopsis roswellensis
Chaves

Mammal

Bat, Lesser (=Sanborn's) Long-
Leptonycteris curasoae
Hidalgo

Bat, Mexican Long-nosed
Leptonycteris nivalis
Hidalgo

Ferret, Black-footed
Mustela nigripes
Bernalillo
Chaves
Colfax

Mammal

Curry
De Baca
Dona Ana
Eddy
Hidalgo
Lea
Lincoln
Luna
Otero
Quay
Rio Arriba
Roosevelt
Sandoval
Sierra
Taos
Torrance
Valencia

Jaguar
Panthera onca
Hidalgo

Wolf, Gray
Canis lupus
Hidalgo
Luna

Reptile

Rattlesnake, New Mexican Ridge-
Crotalus willardi obscurus
Hidalgo

New York

Ferns

Fern, American hart's-tongue
Asplenium scolopendrium var. americanum
Onondaga

Mammal

Bat, Indiana
Myotis sodalis
Allegany
Cattaraugus

Chautauqua
Cortland
Erie
Franklin

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Mammal

Onondaga
Orleans
Schoharie
St. Lawrence

Monocot

Pogonia, Small Whorled
Isotria medeoloides
Onondaga

North Carolina

Bird

Plover, Piping
Charadrius melodus
Brunswick
Carteret
Currituck
Hyde
New Hanover
Onslow
Pamlico
Stork, Wood
Mycteria americana
Brunswick
Tern, Roseate
Sterna dougallii dougallii
Carteret
Woodpecker, Red-cockaded
Picoides borealis
Beaufort
Bladen
Brunswick
Carteret
Chatham
Columbus
Craven
Cumberland
Currituck
Edgecombe
Franklin
Greene
Halifax
Harnett
Hoke
Hyde

Bird

Johnston
Lee
Lenoir
Moore
Nash
New Hanover
Onslow
Orange
Pamlico
Pasquotank
Pitt
Richmond
Sampson
Scotland
Stanly
Tyrrell
Union
Wake
Washington
Wayne
Wilson

Bivalve

Mussel, Dwarf Wedge
Alasmidonta heterodon
Franklin
Granville
Halifax
Johnston
Nash
Orange
Wake
Wilson
Mussel, Heelsplitter Carolina
Lasmigona decorata
Cabarrus
Richmond
Union
Mussel, Oyster
Epioblasma capsaeformis
Madison
Pearlymussel, Little-wing
Pegias fabula
Chowan

Bivalve

Purple Bean
Villosa perpurpurea
Chowan
Spinymussel, James River
Pleurobema collina
Rockingham
Spinymussel, Tar River
Elliptio steinstansana
Edgecombe
Edgecombe
Franklin
Halifax
Johnston
Nash
Pitt

Dicot

Amaranth, Seabeach
Amaranthus pumilus
Brunswick
Carteret
Currituck
Hyde
New Hanover
Onslow
Avens, Spreading
Geum radiatum
Burke
Bittercress, Small-anthered
Cardamine micranthera
Edgecombe
Stokes
Blazing Star, Heller's
Liatris helleri
Burke
Chaffseed, American
Schwalbea americana
Bladen
Cumberland
Hoke
Moore
Scotland
Coneflower, Smooth
Echinacea laevigata
Durham
Granville

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Dicot

Orange
Rockingham

Dropwort, Canby's
Oxypolis canbyi
Scotland

Harperella
Ptilimnium nodosum
Chatham
Granville
Lee

Heartleaf, Dwarf-flowered
Hexastylis naniflora
Burke
Catawba
Lincoln
Polk

Heather, Mountain Golden
Hudsonia montana
Burke

Joint-vetch, Sensitive
Aeschynomene virginica
Beaufort
Craven
Hyde
Lenoir

Loosestrife, Rough-leaved
Lysimachia asperulaefolia
Beaufort
Bladen
Brunswick
Carteret
Columbus
Cumberland
Harnett
Hoke
Moore
New Hanover
Onslow
Pamlico
Richmond
Scotland

Meadowrue, Cooley's
Thalictrum cooleyi
Brunswick

Dicot

Columbus
New Hanover
Onslow

Pondberry
Lindera melissifolia
Bladen
Cumberland
Sampson

Spiraea, Virginia
Spiraea virginiana
Tyrrell

Sumac, Michaux's
Rhus michauxii
Cumberland
Davie
Durham
Franklin
Hoke
Johnston
Lincoln
Moore
Orange
Richmond
Scotland
Wake
Wilson

Sunflower, Schweinitz's
Helianthus schweinitzii
Cabarrus
Davidson
Rowan
Stanly
Stokes
Surry
Union

Insect

Butterfly, Saint Francis' Satyr
Neonympha mitchellii francisci
Cumberland
Hoke

Mammal

Bat, Gray
Myotis grisescens
Madison

Mammal

Bat, Indiana
Myotis sodalis
Alexander
Chowan
Polk

Squirrel, Carolina Northern Flying
Glaucomys sabrinus coloratus
Madison

Monocot

Irisette, White
Sisyrinchium dichotomum
Polk

Pogonia, Small Whorled
Isotria medeoloides
Burke
Chowan
Polk
Surry

Sedge, Golden
Carex lutea
Onslow

Reptile

Sea turtle, green
Chelonia mydas
Brunswick
Carteret
Hyde
New Hanover
Onslow

Sea turtle, hawksbill
Eretmochelys imbricata
Carteret
Hyde

Sea turtle, Kemp's ridley
Lepidochelys kempii
Beaufort
Brunswick
Carteret
Hyde
Pamlico

Sea turtle, leatherback
Dermochelys coriacea
Brunswick
Carteret

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Reptile

Craven
Currituck
Hyde
Onslow

Sea turtle, loggerhead
Caretta caretta

Water

Beaufort
Brunswick
Carteret
Chowan
Craven
Currituck
Hyde
New Hanover
Onslow
Pamlico
Pasquotank

Tyrrell

Washington

Ohio

Bird

Plover, Piping
Charadrius melodus

Ashtabula

Lucas

Bivalve

Fanshell
Cyprogenia stegaria

Meigs

Washington

Mucket, Pink (Pearlymussel)
Lampsilis abrupta

Meigs

Washington

Mussel, Clubshell
Pleurobema clava

Ashtabula
Delaware
Fairfield

Dicot

Hamilton

Spiraea, Virginia
Spiraea virginiana

Scioto

Insect

Beetle, American Burying

Nicrophorus americanus

Vinton

Butterfly, Karner Blue
Lycaeides melissa samuelis

Lucas

Dragonfly, Hine's Emerald
Somatochlora hineana

Lucas

Mammal

Bat, Indiana
Myotis sodalis

Allen

Ashland
Ashtabula

Brown
Darke

Delaware

Fairfield

Geauga

Guernsey
Hamilton
Hardin

Highland

Huron

Licking
Logan

Lucas

Meigs

Paulding
Putnam

Scioto
Tuscarawas
Vinton
Washington

Monocot

Lucas

Pogonia, Small Whorled
Isotria medeoloides

Scioto

Reptile

Snake, Northern Copperbelly

Nerodia erythrogaster neglecta

Hardin

Oklahoma

Bird

Crane, Whooping
Grus americana

Beckham
Blaine
Caddo
Canadian

Carter

Cleveland

Comanche
Cotton
Custer

Garfield

Garvin

Grady

Grant
Greer

Harmon
Jackson

Jefferson

Johnston

Kingfisher
Lincoln

Logan

Love

Major
Marshall

McClain
Murray
Muskogee

Tuscarawas

Dicot

Clover, Running Buffalo
Trifolium stoloniferum

Monocot

Orchid, Eastern Prairie Fringed
Platanthera leucophaea

Noble
Oklahoma
Oklahoma
Osage
Pawnee
Pawnee

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Bird

Payne
Rogers
Stephens
Texas
Tillman
Wagoner
Washington
Washita

Curlew, Eskimo
Numenius borealis
Osage

Plover, Piping
Charadrius melodus
Atoka
Blaine
Bryan
Caddo
Canadian
Carter
Cherokee
Choctaw
Cleveland
Comanche
Cotton
Creek
Custer
Delaware
Garfield
Grady
Grant
Harmon
Haskell
Hughes
Jackson
Jefferson
Johnston
Kay
Kingfisher
Le Flore
Lincoln
Logan
Love
Major
Marshall

Bird

Mayes
McClain
McCurtain
McIntosh
Muskogee
Noble
Nowata
Oklahoma
Osage
Ottawa
Pawnee
Payne
Pittsburg
Pontotoc
Pottawatomie
Pushmataha
Rogers
Seminole
Sequoyah
Texas
Tillman
Tulsa
Wagoner
Washington

Tern, Interior (population) Least
Sterna antillarum
Blaine
Bryan
Canadian
Choctaw
Cleveland
Comanche
Cotton
Creek
Custer
Grady
Harmon
Haskell
Hughes
Jackson
Jefferson
Johnston
Kay
Kingfisher

Bird

Le Flore
Logan
Love
Major
Marshall
McClain
McCurtain
McIntosh
Murray
Muskogee
Noble
Oklahoma
Osage
Pawnee
Payne
Pittsburg
Pontotoc
Pottawatomie
Rogers
Seminole
Sequoyah
Texas
Tillman
Tulsa
Wagoner

Vireo, Black-capped
Vireo atricapilla
Blaine
Caddo
Canadian
Cleveland
Comanche

Woodpecker, Red-cockaded
Picoides borealis
Bryan
Le Flore
McCurtain
Pittsburg
Pushmataha

Bivalve

Mussel, Scaleshell
Leptodea leptodon
Choctaw
Le Flore

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Bivalve

McCurtain
Pushmataha

Rock-pocketbook, Ouachita
(=Wheeler's pm)
Arkansia wheeleri

Le Flore
McCurtain

Pushmataha

Insect

Beetle, American Burying
Nicrophorus americanus

Atoka
Bryan

Cherokee
Choctaw
Coal
Haskell
Le Flore
McCurtain
Muskogee
Pittsburg
Pushmataha
Sequoyah

Tulsa

Mammal

Bat, Gray
Myotis grisescens

Adair
Cherokee
Delaware
Ottawa

Bat, Indiana
Myotis sodalis

Adair
Cherokee
Craig
Delaware
Haskell
Le Flore
Mayes
McCurtain
McIntosh
Muskogee
Ottawa

Mammal

Pittsburg
Pushmataha
Sequoyah
Wagoner

Bat, Ozark Big-eared
Corynorhinus (=Plecotus) townsendii ingens

Adair
Cherokee
Delaware
Ottawa
Sequoyah

Monocot

Orchid, Eastern Prairie Fringed
Platanthera leucophaea

Choctaw

Orchid, Western Prairie Fringed
Platanthera praeclara

Craig
Rogers

Oregon

Bird

Murrelet, Marbled
Brachyramphus marmoratus marmoratus

Baker

Curry
Douglas
Lane
Lincoln
Polk

Owl, Northern Spotted
Strix occidentalis caurina

Benton
Clackamas
Columbia
Coos
Curry
Douglas
Hood River
Jackson
Josephine
Lane
Lincoln

Bird

Linn
Marion
Multnomah
Polk
Washington
Washington
Yamhill

Pelican, Brown
Pelecanus occidentalis

Coos
Curry
Lane
Lincoln

Plover, Western Snowy
Charadrius alexandrinus nivosus

Coos
Curry
Douglas
Lane
Lincoln

Crustacean

Fairy Shrimp, Vernal Pool
Branchinecta lynchi
Branchinecta lynchi

Jackson

Dicot

Catchfly, Spalding's
Silene spaldingii

Wallowa

Checker-mallow, Nelson's
Sidalcea nelsoniana

Benton
Clackamas
Linn
Marion
Polk
Washington
Yamhill

Daisy, Willamette
Erigeron decumbens var.

Benton
Lane
Linn
Marion
Polk

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Dicot

Four-o'clock, Macfarlane's
Mirabilis macfarlanei
Wallowa

Lomatium, Bradshaw's
Lomatium bradshawii
Benton
Lane
Linn
Marion
Polk

Lomatium, Cook's
Lomatium cookii
Jackson
Josephine

Lupine, Kincaid's
Lupinus sulphureus (=oreganus)
ssp. kincaidii (=var. kincaidii)
Benton
Douglas
Lane
Linn
Polk
Yamhill

Meadowfoam, Large-flowered Woolly
Limnanthes floccosa ssp.
Jackson

Popcornflower, Rough
Plagiobothrys hirtus
Douglas

Thelypody, Howell's Spectacular
Thelypodium howellii spectabilis
Baker
Union

Insect

Butterfly, Fender's Blue
Icaricia icarioides fenderi
Benton
Lane
Polk
Yamhill

Insect

Yamhill

Mammal

Deer, Columbian White-tailed
Odocoileus virginianus leucurus
Columbia
Douglas
Multnomah

Monocot

Fritillaria gentneri
Fritillary, Gentner's
Jackson
Josephine

Lily, Western
Lilium occidentale
Coos

Pennsylvania

Mammal

Bat, Indiana
Myotis sodalis
Bedford
Berks
Blair
Clearfield
Dauphin
Delaware
Greene
Lackawanna
Lancaster
Lebanon
Lehigh
Pike
Susquehanna
Washington
Wyoming
York

Monocot

Bulrush, Northeastern (=Barbed
Scirpus ancistrochaetus

Reptile

Turtle, Bog (Northern population)
Clemmys muhlenbergii
Berks
Lancaster
Lebanon
Lehigh
York

South Carolina

Amphibian

Amphibian

Salamander, Flatwoods
Ambystoma cingulatum
Beaufort
Beaufort
Berkeley
Berkeley
Charleston
Orangeburg
Orangeburg

Bird

Plover, Piping
Charadrius melodus
Beaufort
Charleston
Charleston
Colleton
Colleton
Georgetown
Georgetown
Horry

Stork, Wood
Mycteria americana
Mycteria americana
Aiken
Allendale
Allendale
Bamberg
Bamberg
Barnwell
Beaufort
Beaufort
Berkeley
Berkeley
Charleston
Charleston
Colleton
Dorchester
Georgetown
Hampton
Horry
Lexington
Marion

Butterfly, Oregon Silverspot
Speyeria zerene hippolyta

Lane
Lincoln

Dauphin
Lackawanna

Reptile

Williamsburg
Warbler, Bachman's
Warbler, Bachman's
Vermivora bachmanii
Charleston

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Bird

Woodpecker, Red-cockaded
Picoides borealis
- Aiken
- Allendale
- Bamberg
- Barnwell
- Beaufort
- Berkeley
- Calhoun
- Charleston
- Chesterfield
- Clarendon
- Colleton
- Darlington
- Dillon
- Dorchester
- Edgefield
- Florence
- Georgetown
- Hampton
- Horry
- Kershaw
- Laurens
- Lee
- Lexington
- Marion
- Marlboro
- McCormick
- Orangeburg
- Pickens
- Richland
- Saluda
- Sumter
- Williamsburg

Bivalve

Mussel, Heelsplitter Carolina
Lasmigona decorata
- Chesterfield
- Edgefield
- Greenwood
- Kershaw
- Lancaster
- McCormick

Dicot

Amaranth, Seabeach
Amaranthus pumilus
- Charleston
- Georgetown
- Horry

Amphianthus, Little
Amphianthus pusillus
- Lancaster
- Saluda
- York

Chaffseed, American
Schwalbea americana
- Barnwell
- Beaufort
- Berkeley
- Charleston
- Clarendon
- Florence
- Georgetown
- Horry
- Lee
- Sumter
- Williamsburg

Coneflower, Smooth
Echinacea laevigata
- Aiken
- Allendale
- Anderson
- Barnwell
- Lancaster
- Lexington
- Oconee
- Pickens
- Richland

Dropwort, Canby's
Oxypolis canbyi
- Allendale
- Bamberg
- Barnwell
- Beaufort
- Berkeley
- Charleston
- Clarendon
- Colleton

Dicot

- Dorchester
- Georgetown
- Hampton
- Horry
- Lee
- Marlboro
- Orangeburg
- Pickens
- Richland
- Sumter
- Williamsburg

Gooseberry, Miccosukee
Ribes echinellum
- Edgefield
- McCormick

Harperella
Ptilimnium nodosum
- Aiken
- Barnwell
- Saluda

Heartleaf, Dwarf-flowered
Hexastylis naniflora
- Greenville
- Spartanburg
- York

Loosestrife, Rough-leaved
Lysimachia asperulaefolia
- Chesterfield
- Darlington
- Greenwood
- Horry
- Kershaw
- Marlboro
- Pickens
- Richland

Pitcher-plant, Mountain Sweet
Sarracenia rubra ssp. jonesii
- Greenville

Pondberry
Lindera melissifolia
- Barnwell
- Beaufort
- Berkeley
- Charleston

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Dicot

Colleton
Dorchester
Georgetown
Horry

Sunflower, Schweinitz's
Helianthus schweinitzii
Horry
Lancaster
Lexington
York

Ferns

Quillwort, Black-spored
Isoetes melanospora
Lancaster

Mammal

Bat, Indiana
Myotis sodalis
Oconee

Monocot

Arrowhead, Bunched
Sagittaria fasciculata

Greenville

Irisette, White
Sisyrinchium dichotomum

Greenville

Pink, Swamp
Helonias bullata

Greenville

Pogonia, Small Whorled
Isotria medeoloides
Greenville
Oconee

Trillium, Persistent
Trillium persistens
Oconee

Trillium, Relict
Trillium reliquum
Aiken
Edgefield

Reptile

Sea turtle, green
Chelonia mydas

Charleston

Reptile

Colleton
Georgetown
Horry

Sea turtle, Kemp's ridley
Lepidochelys kempii
Beaufort
Charleston
Colleton
Georgetown
Horry

Sea turtle, leatherback
Dermochelys coriacea

Beaufort
Charleston
Colleton
Georgetown

Horry

Sea turtle, loggerhead
Caretta caretta

Beaufort
Berkeley

Charleston
Colleton

Georgetown

Horry

Snake, Eastern Indigo
Drymarchon corais couperi

Hampton

South Dakota

Bird

Crane, Whooping
Grus americana

Lawrence

Mammal

Ferret, Black-footed
Mustela nigripes
Lawrence

Tennessee

Bird

Stork, Wood
Mycteria americana

Shelby

Bird

Tern, Interior (population) Least
Sterna antillarum
Lake
Shelby
Tipton

Woodpecker, Red-cockaded
Picoides borealis
Chester
McNairy
Morgan

Bivalve

Mucket, Pink (Pearlymussel)
Lampsilis abrupta
Montgomery

Mussel, Cumberland Elktoe
Alasmidonta atropurpurea
Alasmidonta atropurpurea
Morgan

Mussel, Rough Pigtoe
Pleurobema plenum
Pleurobema plenum
Montgomery

Pearlymussel, Alabama Lamp
Pearlymussel, Alabama Lamp
Lampsilis virescens
Lampsilis virescens
Morgan

Pearlymussel, Dromedary
Dromus dromas
Dromus dromas
Montgomery

Pearlymussel, Orange-footed
Plethobasus cooperianus
Plethobasus cooperianus
Montgomery

Pearlymussel, Tubercled-blossom
Epioblasma torulosa torulosa
Washington

Pearlymussel, Turgid-blossom
Epioblasma turgidula
Shelby

Pearlymussel, Yellow-blossom
Pearlymussel, Yellow-blossom
Epioblasma florentina florentina
Rutherford

Purple Bean
Villosa perpurpurea
Morgan

Riffleshell, Tan
Epioblasma florentina walkeri (=E. walkeri)

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Bivalve

Montgomery
Rutherford

Dicot

Clover, Leafy Prairie

Dalea foliosa
Rutherford

Coneflower, Tennessee Purple
Echinacea tennesseensis
Rutherford

Ground-plum, Guthrie's
Astragalus bibullatus
Rutherford

Potato-bean, Price's
Apios priceana
Montgomery

Rock-cress, Large (=Braun's)
Arabis perstellata E. L. Braun var. ampla Rollins
Rutherford

Rosemary, Cumberland
Conradina verticillata
Morgan

Cave
Sandwort, Cumberland
Arenaria cumberlandensis
Morgan

Spiraea, Virginia
Spiraea virginiana
Morgan

Mammal

Bat, Gray
Myotis grisescens

Montgomery
Overton
Rutherford

Bat, Indiana
Myotis sodalis
Chester
Coffee
Henry

Lake

Madison

Montgomery

Morgan

Obion

Mammal

Overton
Rutherford
Shelby
Tipton

Washington
Weakley

Monocot

Pogonia, Small Whorled
Isotria medeoloides
Washington

Texas

Amphibian

Salamander, Barton Springs
Eurycea sosorum
Hays

Travis

Salamander, San Marcos
Eurycea nana

Bexar
Comal
Hays

Medina
Uvalde

Salamander, Texas Blind
Typhlomolge rathbuni
Bexar
Comal

Hays
Medina
Uvalde

Toad, Houston
Bufo houstonensis
Austin

Bastrop
Burleson
Colorado
Fort Bend
Freestone

Harris

Harrison

Lavaca

Lee

Leon

Amphibian

Milam
Robertson

Arachnid

Harvestman, Bee Creek Cave
Texella reddelli
Burnet
Travis
Williamson

Harvestman, Bone Cave
Texella reyesi
Travis
Williamson

Harvestman, Robber Baron Cave
Texella cokendolpheri
Bexar

Meshweaver, Braken Bat Cave
Meshweaver, Braken Bat Cave
Cicurina venii
Bexar

Pseudoscorpion, Tooth Cave
Tartarocreagris texana
Travis

Spider, Government Canyon

Neoleptoneta microps
Bexar

Spider, Madla's Cave
Cicurina madla
Bexar

Spider, Robber Baron Cave
Cicurina baronia
Bexar

Spider, Tooth Cave
Neoleptoneta myopica
Travis

Spider, Vesper Cave
Cicurina vespera
Bexar

Bird

Crane, Whooping
Grus americana

Angelina

Aransas

Archer

Armstrong

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Bird

Austin
Bastrop
Baylor
Bee
Bell
Bexar
Blanco
Bosque
Brazoria
Brazos
Brewster
Brown
Burleson
Burnet
Caldwell
Callahan
Clay
Coleman
Collin
Collingsworth
Colorado
Comanche
Cooke
Coryell
Crosby
De Witt
Denton
Donley
Eastland
Ellis
Erath
Falls
Fayette
Fort Bend
Garza
Gillespie
Goliad
Gonzales
Gray
Guadalupe
Hamilton
Hardeman
Harrison
Haskell

Bird

Hays
Hill
Hood
Howard
Jack
Jackson
Johnson
Jones
Karnes
Knox
Lamar
Lampasas
Lavaca
Lee
Limestone
Llano
Lubbock
Lynn
Mason
Matagorda
Maverick
Midland
Milam
Mills
Montague
Palo Pinto
Parker
Randall
Refugio
Robertson
San Patricio
San Saba
Somervell
Sterling
Tarrant
Terry
Throckmorton
Travis
Victoria
Washington
Wharton
Wheeler
Wichita
Williamson

Bird

Wilson
Wise
Young
Curlew, Eskimo
Numenius borealis
Aransas
Chambers
Galveston
Falcon, Northern Aplomado
Falco femoralis septentrionalis
Brewster
Brooks
Cameron
Culberson
Dimmit
Ector
El Paso
Frio
Hidalgo
Hudspeth
Jeff Davis
Maverick
Midland
Nueces
Pecos
Presidio
Reeves
San Patricio
Val Verde
Ward
Webb
Winkler
Flycatcher, Southwestern Willow
Empidonax traillii extimus
Brewster
Culberson
El Paso
Hudspeth
Jeff Davis
Presidio
Owl, Mexican Spotted
Strix occidentalis lucida
Culberson
El Paso

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Bird	Bird	Bird
Hudspeth	Washington	Brewster
Jeff Davis	Tern, Interior (population) Least	Brown
Pelican, Brown	*Sterna antillarum*	Burnet
Pelecanus occidentalis	Bowie	Callahan
Aransas	Briscoe	Coke
Brazoria	Clay	Coleman
Cameron	Collingsworth	Comal
Chambers	Cooke	Comanche
Galveston	Dallas	Concho
Jackson	Delta	Cooke
Jefferson	Denton	Coryell
Matagorda	Donley	Crockett
Nueces	El Paso	Dallas
Refugio	Fannin	Eastland
San Patricio	Freestone	Edwards
Victoria	Gray	Erath
Plover, Piping	Grayson	Gillespie
Charadrius melodus	Gregg	Grayson
Angelina	Hardeman	Hamilton
Aransas	Hemphill	Hays
Brazoria	Jeff Davis	Hill
Cameron	Lamar	Hood
Chambers	Leon	Irion
Dallas	Limestone	Jack
Delta	Milam	Jeff Davis
Denton	Montague	Johnson
Galveston	Rains	Kendall
Grayson	Randall	Kerr
Jefferson	Red River	Kimble
Matagorda	Robertson	Lampasas
Nueces	Tarrant	Llano
Refugio	Throckmorton	Maverick
San Patricio	Tom Green	McCulloch
Tarrant	Val Verde	McLennan
Throckmorton	Webb	Medina
Prairie-chicken, Attwater's Greater	Wheeler	Menard
Tympanuchus cupido attwateri	Wichita	Midland
Aransas	Vireo, Black-capped	Mills
Austin	*Vireo atricapilla*	Montague
Colorado	Bandera	Nolan
Galveston	Bell	Palo Pinto
Goliad	Bexar	Parker
Refugio	Blanco	Pecos
Victoria	Bosque	Reagan

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Bird

Real
Runnels
San Saba
Schleicher
Shackelford
Somervell
Stephens
Sutton
Taylor
Tom Green
Travis
Upton
Uvalde
Val Verde
Williamson
Wise

Warbler (=Wood), Golden-cheeked

Dendroica chrysoparia
Bandera
Bell
Bexar
Blanco

Bosque
Burnet
Comal

Hedgehog
Comanche
Coryell
Dallas
Eastland
Edwards
Erath
Gillespie
Hamilton
Hays
Hill
Hood
Johnson
Kendall
Kerr
Kimble
Lampasas
Llano
Mason
McLennan

Bird

Medina
Menard
Palo Pinto
Real
San Saba
Somervell
Stephens
Travis
Uvalde
Williamson
Young

Woodpecker, Red-cockaded
Picoides borealis
Anderson
Angelina
Bowie
Cass

Cherokee
Hardin
Harrison
Hood
Houston

Jasper
Liberty
Marion

Montgomery
Nacogdoches
Newton
Panola
Polk
Red River
Sabine
San Augustine
San Jacinto
Trinity
Tyler
Walker

Crustacean

Amphipod, Peck's Cave
Stygobromus (=Stygonectes) pecki
Bexar
Comal
Hays
Medina

Crustacean

Uvalde

Dicot

Ambrosia, South Texas
Ambrosia cheiranthifolia
Cameron
Hidalgo
Jim Wells
Nueces

Ayenia, Texas
Ayenia limitaris
Cameron
Hidalgo
Nueces

Bladderpod, White
Lesquerella pallida
San Augustine

Cactus, Black Lace
Echinocereus reichenbachii var.
Jim Wells
Refugio
Uvalde

Cactus, Bunched Cory
Coryphantha ramillosa
Brewster

Cactus, Chisos Mountain

Echinocereus chisoensis var. chisoensis
Brewster

Cactus, Lloyd's Mariposa
Echinomastus mariposensis
Brewster
Presidio

Cactus, Nellie Cory
Coryphantha minima
Brewster

Cactus, Sneed Pincushion
Coryphantha sneedii var. sneedii
Culberson
El Paso
Hudspeth

Cactus, Star
Astrophytum asterias
Cameron
Hidalgo

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Dicot

Cactus, Tobusch Fishhook
Ancistrocactus tobuschii
Bandera
Edwards
Kerr
Kimble
Real
Uvalde
Val Verde

Cat's-eye, Terlingua Creek
Cryptantha crassipes
Brewster

Dawn-flower, Texas Prairie (=Texas Bitterweed)
Hymenoxys texana
Fort Bend
Harris
Harrison

Dogweed, Ashy
Thymophylla tephroleuca
Webb

Frankenia, Johnston's
Frankenia johnstonii
Webb

Fruit, Earth (=geocarpon)
Geocarpon minimum
Anderson

Manioc, Walker's
Manihot walkerae
Hidalgo

Oak, Hinckley
Quercus hinckleyi
Brewster
Presidio

Phlox, Texas Trailing
Phlox nivalis ssp. texensis
Hardin
Polk
Tyler

Pitaya, Davis' Green
Echinocereus viridiflorus var. davisii
Brewster

Poppy-mallow, Texas
Callirhoe scabriuscula

Dicot

Coke
Mitchell
Runnels

Rush-pea, Slender
Hoffmannseggia tenella
Nueces

Sand-verbena, Large-fruited
Abronia macrocarpa
Freestone
Leon
Robertson

Snowbells, Texas
Styrax texanus
Bandera
Edwards
Kimble
Real
Uvalde
Val Verde

Sunflower, Pecos
Helianthus paradoxus
Pecos
Reeves

Wild-buckwheat, Gypsum
Eriogonum gypsophilum
Culberson

Gastropod

Snail, Pecos Assiminea
Assiminea pecos
Pecos
Reeves

Insect

Beetle, American Burying
Nicrophorus americanus
Lamar
Red River

Beetle, Coffin Cave Mold
Batrisodes texanus
Williamson

Beetle, Comal Springs Dryopid
Stygoparnus comalensis
Bexar
Comal
Hays

Insect

Medina
Uvalde

Beetle, Comal Springs Riffle
Heterelmis comalensis
Bexar
Comal
Hays
Medina
Uvalde

Beetle, Helotes Mold
Batrisodes venyivi
Bexar

Beetle, Kretschmarr Cave Mold
Texamaurops reddelli
Travis

Beetle, Tooth Cave Ground
Rhadine persephone
Travis
Williamson

Rhadine exilis (ncn)
Rhadine exilis
Bexar

Rhadine infernalis (ncn)
Rhadine infernalis
Rhadine infernalis
Bexar

Mammal

Bat, Mexican Long-nosed
Leptonycteris nivalis
Leptonycteris nivalis
Brewster
Presidio

Bear, Louisiana Black
Bear, Louisiana Black
Ursus americanus luteolus
Anderson
Angelina
Aransas
Aransas
Bowie
Burleson
Cass
Cherokee
Delta
Delta
Fannin
Gregg
Harrison
Harrison
Jasper

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Mammal

Lamar
Lavaca
Leon
Marion
Morris
Nacogdoches
Newton
Panola
Refugio
Robertson
Rusk
Sabine
San Augustine
Smith
Upshur
Victoria
Washington

Jaguarundi, Gulf Coast
Herpailurus (=Felis) yagouaroundi cacomitli

Aransas
Atascosa
Bee
Brooks
Cameron
Dimmit
Frio
Hidalgo
Jim Hogg
Jim Wells
Karnes
La Salle
Live Oak
Maverick
Nueces
Refugio
San Patricio
Webb
Zavala

Jaguarundi, Sinaloan
Herpailurus (=Felis) yagouaroundi tolteca

Aransas
Brooks

Mammal

Hidalgo
Jim Wells
Live Oak
Nueces
San Patricio

Ocelot
Leopardus (=Felis) pardalis

Aransas
Atascosa
Bee
Brooks
Cameron
Dimmit
Frio
Hidalgo
Jim Hogg
Jim Wells
Karnes
La Salle
Live Oak
Maverick
Nueces
Refugio
San Patricio
Webb
Zavala

Monocot

Ladies'-tresses, Navasota
Spiranthes parksii

Bastrop
Brazos
Burleson
Freestone
Grimes
Jasper
Leon
Madison
Milam
Robertson
Washington

Pondweed, Little Aguja Creek
Potamogeton clystocarpus

Jeff Davis

Monocot

Wild-rice, Texas
Zizania texana

Bexar
Comal
Hays
Medina
Uvalde

Reptile

Sea turtle, green
Chelonia mydas

Aransas
Brazoria
Cameron
Chambers
Galveston
Jefferson
Matagorda
Nueces
Refugio
Refugio

Sea turtle, hawksbill
Sea turtle, hawksbill
Eretmochelys imbricata

Aransas
Brazoria
Cameron
Chambers
Galveston
Jefferson
Matagorda
Nueces
Refugio
San Patricio

Sea turtle, Kemp's ridley
Sea turtle, Kemp's ridley
Lepidochelys kempii

Aransas
Aransas
Brazoria
Brazoria
Cameron
Cameron
Chambers
Chambers
Galveston
Galveston
Jefferson
Matagorda
Matagorda
Nueces
Refugio
San Patricio

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Reptile

Sea turtle, leatherback
Dermochelys coriacea
Aransas
Brazoria
Cameron
Chambers
Galveston
Jefferson
Matagorda
Nueces
Refugio
San Patricio

Sea turtle, loggerhead
Caretta caretta
Aransas
Brazoria
Cameron
Chambers
Galveston
Jefferson
Matagorda
Nueces
Refugio
San Patricio

Snake, Concho Water
Nerodia paucimaculata
Brown
Coke
Coleman
Concho
Irion
Lampasas
Maverick
McCulloch
Mills
Mitchell
Runnels
San Saba
Tom Green

Utah

Bird

Alasmidonta heterodon

Flycatcher, Southwestern Willow
Empidonax traillii extimus
Washington

Owl, Mexican Spotted
Strix occidentalis lucida
Kane
Washington
Wayne

Dicot

Bear-poppy, Dwarf
Arctomecon humilis
Washington

Bladderpod, Kodachrome
Lesquerella tumulosa
Kane

Cactus, Siler Pincushion
Pediocactus (=Echinocactus,=Utahia) sileri
Kane
Washington

Cactus, Uinta Basin Hookless
Sclerocactus glaucus
Duchesne

Cactus, Winkler
Pediocactus winkleri
Wayne

Cactus, Wright Fishhook
Sclerocactus wrightiae
Wayne

Cycladenia, Jones
Cycladenia jonesii (=humilis)
Kane

Daisy, Maguire
Erigeron maguirei
Wayne

Milk-vetch, Deseret
Astragalus desereticus
Utah

Milk-vetch, Holmgren
Astragalus holmgreniorum
Washington

Milk-vetch, Shivwits
Astragalus ampullarioides
Washington

Milkweed, Welsh's
Asclepias welshii
Kane

Phacelia, Clay
Phacelia argillacea
Utah

Reed-mustard, Barneby
Schoenocrambe barnebyi
Wayne

Reed-mustard, Shrubby
Schoenocrambe suffrutescens
Duchesne

Ridge-cress (=Pepper-cress),
Lepidium barnebyanum
Duchesne

Townsendia, Last Chance
Townsendia, Last Chance
Townsendia aprica
Wayne

Mammal

Ferret, Black-footed
Mustela nigripes
Duchesne

Prairie Dog, Utah
Cynomys parvidens
Washington
Wayne

Monocot

Ladies'-tresses, Ute
Spiranthes diluvialis
Duchesne
Salt Lake
Tooele
Utah
Wayne
Weber

Reptile

Tortoise, Desert
Gopherus agassizii
Washington

Vermont

Bivalve

Mussel, Dwarf Wedge
Windsor
Windsor

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Dicot

Milk-vetch, Jesup's
Astragalus robbinsii var. jesupi
Windsor

Mammal

Bat, Indiana
Myotis sodalis
Bennington
Chittenden
Windsor

Monocot

Bulrush, Northeastern (=Barbed
Scirpus ancistrochaetus
Windham

Virginia

Amphibian

Salamander, Shenandoah
Plethodon shenandoah
Madison
Rappahannock

Bird

Plover, Piping
Charadrius melodus
York

Woodpecker, Red-cockaded
Picoides borealis
Sussex

Bivalve

Mussel, Cumberland Combshell
Epioblasma brevidens
Lee

Mussel, Dwarf Wedge
Alasmidonta heterodon
Culpeper
Cumberland
Fauquier
Franklin
Greensville
King George
King William

Bivalve

Prince Edward
Prince William
Sussex

Mussel, Fine-rayed Pigtoe
Fusconaia cuneolus
Lee
Washington

Mussel, Oyster
Epioblasma capsaeformis
Lee

Mussel, Shiny Pigtoe
Fusconaia cor
Lee
Washington

Pearlymussel, Appalachian
Quadrula sparsa
Lee

Pearlymussel, Birdwing
Conradilla caelata
Lee
Washington

Pearlymussel, Cracking
Hemistena lata
Lee

Pearlymussel, Cumberland Bean
Villosa trabalis
Lee

Pearlymussel, Cumberland
Quadrula intermedia
Lee
Washington

Pearlymussel, Dromedary
Dromus dromas
Lee

Pearlymussel, Little-wing
Pegias fabula
Lee
Washington

Purple Bean
Villosa perpurpurea
Lee

Bivalve

Lee
Washington

Riffleshell, Tan
Epioblasma florentina walkeri (=E. walkeri)
Washington
Washington

Spinymussel, James River
Pleurobema collina
Albemarle
Botetourt
Floyd
Franklin
Franklin
Goochland
Goochland
Nelson
Patrick
Pittsylvania

Crustacean

Isopod, Lee County Cave
Lirceus usdagalun
Lee

Isopod, Madison Cave
Antrolana lira
Augusta

Dicot

Bittercress, Small-anthered
Cardamine micranthera
Patrick

Chaffseed, American
Schwalbea americana
Greensville
Sussex

Coneflower, Smooth
Echinacea laevigata
Appomattox
Bedford
Botetourt
Floyd
Franklin
Mecklenburg
Montgomery
Nelson

Louisa	Washington	Nottoway
Nottoway Orange	Rabbitsfoot, Rough *Quadrula cylindrica strigillata*	Pittsylvania Prince Edward

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Dicot

Pulaski

Harperella
Ptilimnium nodosum
Frederick
Mecklenburg
Prince William

Joint-vetch, Sensitive
Aeschynomene virginica
Caroline
Charles City
James City
King George
King William
Prince William

Rock-cress, Shale Barren
Arabis serotina
Augusta
Bath
Shenandoah

Sneezeweed, Virginia
Helenium virginicum
Augusta
Nelson

Spiraea, Virginia
Spiraea virginiana
Lee
Washington

Sumac, Michaux's
Rhus michauxii
Cumberland
Greensville
Mecklenburg
Nottoway
Prince Edward
Sussex

Sunflower, Schweinitz's
Helianthus schweinitzii

Patrick

Gastropod

Snail, Virginia Fringed Mountain
Polygyriscus virginianus

Pulaski

Insect

Beetle, Northeastern Beach Tiger
Cicindela dorsalis dorsalis
Northumberland
York

Butterfly, Mitchell's Satyr
Neonympha mitchellii mitchellii
Floyd
Franklin
Montgomery
Patrick
Pulaski

Mammal

Bat, Gray
Myotis grisescens
Lee
Washington

Bat, Indiana
Myotis sodalis
Albemarle
Augusta
Bath
Bedford
Botetourt
Fauquier
Floyd
Frederick
Lee
Madison
Montgomery
Nelson
Pulaski
Rappahannock
Shenandoah
Washington

Bat, Virginia Big-eared
Corynorhinus (=Plecotus) townsendii virginianus

Augusta
Bath

Montgomery

Pulaski

Shenandoah

Squirrel, Virginia Northern Flying
Glaucomys sabrinus fuscus

Mammal

Washington

Monocot

Bulrush, Northeastern (=Barbed
Scirpus ancistrochaetus
Augusta
Bath
Botetourt
Shenandoah

Orchid, Eastern Prairie Fringed
Platanthera leucophaea
Augusta

Pink, Swamp
Helonias bullata
Augusta
Caroline
Charles City
King William
Nelson

Pogonia, Small Whorled
Isotria medeoloides
Appomattox
Bedford
Botetourt
Buckingham
Caroline
Charles City
Franklin
Gloucester
James City
King George
King William
Lee
Madison
Pittsylvania
Prince William
York

Reptile

Sea turtle, loggerhead
Caretta caretta

Gloucester

Northumberland

Virginia Beach
York

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Washington

Bird

Murrelet, Marbled
Brachyramphus marmoratus marmoratus
- Clallam
- Cowlitz
- Grays Harbor
- Island
- Kitsap
- Kittitas
- Lewis
- Pierce
- Skagit
- Thurston
- Whatcom

Owl, Northern Spotted
Strix occidentalis caurina
- Chelan
- Clallam
- Clark
- Cowlitz
- Grays Harbor
- Island
- Kittitas
- Lewis
- Mason
- Okanogan
- Pierce
- Skagit
- Thurston
- Whatcom
- Yakima

Pelican, Brown
Pelecanus occidentalis
- Clallam
- Grays Harbor

Plover, Western Snowy
Charadrius alexandrinus nivosus
- Grays Harbor

Dicot

Catchfly, Spalding's
Silene spaldingii

Dicot

Checker-mallow, Nelson's
Sidalcea nelsoniana
- Cowlitz

Checker-mallow, Wenatchee
Sidalcea oregana var. calva
- Chelan

Howellia, Water
Howellia aquatilis
- Clark
- Mason
- Spokane
- Thurston

Lupine, Kincaid's
Lupinus sulphureus (=oreganus) ssp. kincaidii (=var. kincaidii)
- Lewis

Paintbrush, Golden
Castilleja levisecta
- Island
- San Juan
- Thurston

Stickseed, Showy
Hackelia venusta
- Chelan

Mammal

Bear, Grizzly
Ursus arctos horribilis
- Chelan
- Kittitas
- Lewis
- Okanogan
- Pierce
- Skagit
- Whatcom
- Yakima

Deer, Columbian White-tailed
Odocoileus virginianus leucurus
- Clark
- Cowlitz

Rabbit, Pygmy
Brachylagus idahoensis
- Adams

Mammal

- Grant
- Lincoln

Wolf, Gray
Canis lupus
- Chelan
- Clark
- Cowlitz
- Kittitas
- Lewis
- Okanogan
- Pierce
- Skagit
- Whatcom
- Yakima

West Virginia

Bivalve

Bivalve

Spinymussel, James River
Spinymussel, James River
Pleurobema collina
- Monroe

Dicot

Dicot

Harperella
Ptilimnium nodosum
Ptilimnium nodosum
- Jefferson
- Jefferson

Mammal

Bat, Indiana
Myotis sodalis
- Berkeley
- Jefferson
- Marion
- Marshall
- Monroe
- Putnam
- Putnam

Monocot

Bulrush, Northeastern (=Barbed
Scirpus ancistrochaetus
- Berkeley

Benton

Lincoln

Douglas

Spokane

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997 Species Affected:

Inverse Name:	Taxa:	Co.	Status:
Abalone, White	Crustacean	19	Endangered
Abutilon eremitopetalum (ncn)	Dicot	2	Endangered
Abutilon sandwicense (ncn)	Dicot	1	Endangered
Achyranthes mutica (ncn)	Dicot	2	Endangered
Achyranthes splendens var. rotundata (ncn)	Dicot	1	Endangered
A'e (Zanthoxylum dipetalum var. tomentosum)	Dicot	2	Endangered
A'e (Zanthoxylum hawaiiense)	Dicot	6	Endangered
'Aiea (Nothocestrum breviflorum)	Dicot	2	Endangered
'Aiea (Nothocestrum peltatum)	Dicot	2	Endangered
'Akepa, Hawaii	Bird	2	Endangered
'Akepa, Maui	Bird	2	Endangered
'Akia Loa, Kauai (Hemignathus procerus)	Bird	2	Endangered
'Akia Pola'au (Hemignathus munroi)	Bird	2	Endangered
'Akoko (Chamaesyce celastroides var. kaenana)	Dicot	1	Endangered
'Akoko (Chamaesyce deppeana)	Dicot	1	Endangered
'Akoko (Chamaesyce herbstii)	Dicot	1	Endangered
'Akoko (Chamaesyce kuwaleana)	Dicot	1	Endangered
'Akoko (Chamaesyce rockii)	Dicot	1	Endangered
'Akoko (Chamaesyce skottsbergii var. skottsbe	Dicot	3	Endangered
'Akoko (Euphorbia haeleeleana)	Dicot	3	Endangered
Alani (Melicope adscendens)	Dicot	2	Endangered
Alani (Melicope balloui)	Dicot	2	Endangered
Alani (Melicope haupuensis)	Dicot	2	Endangered
Alani (Melicope knudsenii)	Dicot	4	Endangered
Alani (Melicope lydgatei)	Dicot	1	Endangered
Alani (Melicope mucronulata)	Dicot	2	Endangered
Alani (Melicope munroi)	Dicot	2	Endangered
Alani (Melicope ovalis)	Dicot	2	Endangered
Alani (Melicope pallida)	Dicot	2	Endangered
Alani (Melicope quadrangularis)	Dicot	2	Endangered
Alani (Melicope reflexa)	Dicot	2	Endangered
Alani (Melicope saint-johnii)	Dicot	1	Endangered
Alani (Melicope zahlbruckneri)	Dicot	2	Endangered
Albatross, Short-tailed	Bird	1	Endangered
Allocarya, Calistoga	Dicot	4	Endangered
Alopecurus, Sonoma	Monocot	6	Endangered
Alsinidendron obovatum (ncn)	Dicot	1	Endangered
Alsinidendron trinerve (ncn)	Dicot	1	Endangered
Alsinidendron viscosum (ncn)	Dicot	2	Endangered
Amaranthus brownii (ncn)	Dicot	1	Endangered
Ambersnail, Kanab	Gastropod	4	Endangered
Ambrosia, San Diego	Dicot	7	Endangered
Ambrosia, South Texas	Dicot	4	Endangered
Amphipod, Illinois Cave	Crustacean	1	Endangered
Amphipod, Kauai Cave	Crustacean	2	Endangered
Amphipod, Noel's	Crustacean	2	Endangered
Amphipod, Peck's Cave	Crustacean	6	Endangered
'Anaunau (Lepidium arbuscula)	Dicot	1	Endangered
'Anunu (Sicyos alba)	Dicot	2	Endangered
Arrowhead, Bunched	Monocot	1	Endangered
Asplenium fragile var. insulare (ncn)	Ferns	2	Endangered
Aster, Florida Golden	Dicot	3	Endangered
Aupaka (Isodendrion hosakae)	Dicot	2	Endangered

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Aupaka (Isodendrion laurifolium)	Dicot	3	Endangered
Avens, Spreading	Dicot	1	Endangered
'Awikiwiki (Canavalia molokaiensis)	Dicot	2	Endangered
'Awiwi (Centaurium sebaeoides)	Dicot	4	Endangered
'Awiwi (Hedyotis cookiana)	Dicot	4	Endangered
Ayenia, Texas	Dicot	3	Endangered
Barberry, Island	Dicot	5	Endangered
Barberry, Nevin's	Dicot	10	Endangered
Bat, Gray	Mammal	144	Endangered
Bat, Hawaiian Hoary	Mammal	7	Endangered
Bat, Indiana	Mammal	418	Endangered
Bat, Lesser (=Sanborn's) Long-nosed	Mammal	25	Endangered
Bat, Mexican Long-nosed	Mammal	4	Endangered
Bat, Ozark Big-eared	Mammal	10	Endangered
Bat, Virginia Big-eared	Mammal	7	Endangered
Beargrass, Britton's	Monocot	6	Endangered
Bear-poppy, Dwarf	Dicot	4	Endangered
Beauty, Harper's	Monocot	1	Endangered
Bedstraw, El Dorado	Dicot	3	Endangered
Bedstraw, Island	Dicot	5	Endangered
Beetle, American Burying	Insect	46	Endangered
Beetle, Coffin Cave Mold	Insect	1	Endangered
Beetle, Comal Springs Dryopid	Insect	6	Endangered
Beetle, Comal Springs Riffle	Insect	6	Endangered
Beetle, Helotes Mold	Insect	1	Endangered
Beetle, Kretschmarr Cave Mold	Insect	1	Endangered
Beetle, Mount Hermon June	Insect	1	Endangered
Beetle, Ohlone Tiger	Insect	1	Endangered
Beetle, Salt Creek Tiger	Insect	3	Endangered
Beetle, Tooth Cave Ground	Insect	2	Endangered
Bird's-beak, Palmate-bracted	Dicot	27	Endangered
Bird's-beak, Pennell's	Dicot	4	Endangered
Bird's-beak, salt marsh	Dicot	24	Endangered
Bird's-beak, Soft	Dicot	12	Endangered
Bittercress, Small-anthered	Dicot	3	Endangered
Bladderpod, Kodachrome	Dicot	1	Endangered
Bladderpod, San Bernardino Mountains	Dicot	4	Endangered
Bladderpod, White	Dicot	1	Endangered
Blazing Star, Scrub	Dicot	2	Endangered
Bluegrass, Hawaiian	Monocot	2	Endangered
Bluegrass, Mann's (Poa mannii)	Monocot	2	Endangered
Bluegrass, Napa	Monocot	4	Endangered
Bluegrass, San Bernardino	Monocot	7	Endangered
Blue-star, Kearney's	Dicot	2	Endangered
Bobwhite, Masked	Bird	2	Endangered
Bonamia menziesii (ncn)	Dicot	7	Endangered
Broom, San Clemente Island	Dicot	6	Endangered
Buckwheat, Cushenbury	Dicot	4	Endangered
Buckwheat, Ione (incl. Irish Hill)	Dicot	1	Endangered
Bulrush, Northeastern (=Barbed Bristle)	Monocot	10	Endangered
Bush-mallow, San Clemente Island	Dicot	6	Endangered
Bush-mallow, Santa Cruz Island	Dicot	5	Endangered
Butterfly, Behren's Silverspot	Insect	7	Endangered
Butterfly, Callippe Silverspot	Insect	4	Endangered
Butterfly, El Segundo Blue	Insect	6	Endangered
Butterfly, Fender's Blue	Insect	8	Endangered
Butterfly, Karner Blue	Insect	4	Endangered

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Butterfly, Lange's Metalmark	Insect	4	Endangered
Butterfly, Lotis Blue	Insect	3	Endangered
Butterfly, Mission Blue	Insect	3	Endangered
Butterfly, Mitchell's Satyr	Insect	9	Endangered
Butterfly, Myrtle's Silverspot	Insect	6	Endangered
Butterfly, Palos Verdes Blue	Insect	6	Endangered
Butterfly, Quino Checkerspot	Insect	7	Endangered
Butterfly, Saint Francis' Satyr	Insect	2	Endangered
Butterfly, San Bruno Elfin	Insect	1	Endangered
Butterfly, Schaus Swallowtail	Insect	2	Endangered
Butterfly, Smith's Blue	Insect	2	Endangered
Button-celery, San Diego	Dicot	7	Endangered
Cactus, Arizona Hedgehog	Dicot	8	Endangered
Cactus, Bakersfield	Dicot	5	Endangered
Cactus, Black Lace	Dicot	4	Endangered
Cactus, Kuenzler Hedgehog	Dicot	7	Endangered
Cactus, Nellie Cory	Dicot	1	Endangered
Cactus, Nichol's Turk's Head	Dicot	5	Endangered
Cactus, Pima Pineapple	Dicot	2	Endangered
Cactus, Sneed Pincushion	Dicot	8	Endangered
Cactus, Star	Dicot	2	Endangered
Cactus, Tobusch Fishhook	Dicot	9	Endangered
Cactus, Wright Fishhook	Dicot	1	Endangered
Campion, Fringed	Dicot	8	Endangered
Caribou, Woodland	Mammal	3	Endangered
Cat's-eye, Terlingua Creek	Dicot	1	Endangered
Ceanothus, Coyote	Dicot	4	Endangered
Ceanothus, Pine Hill	Dicot	3	Endangered
Chaffseed, American	Dicot	21	Endangered
Chamaesyce Halemanui (ncn)	Dicot	2	Endangered
Checker-mallow, Keck's	Dicot	10	Endangered
Checker-mallow, Kenwood Marsh	Dicot	4	Endangered
Checker-mallow, Pedate	Dicot	4	Endangered
Checker-mallow, Wenatchee Mountains	Dicot	3	Endangered
Clarkia, Pismo	Dicot	5	Endangered
Clarkia, Presidio	Dicot	3	Endangered
Clarkia, Vine Hill	Dicot	4	Endangered
Cliffrose, Arizona	Dicot	14	Endangered
Clover, Leafy Prairie	Dicot	10	Endangered
Clover, Monterey	Dicot	2	Endangered
Clover, Running Buffalo	Dicot	46	Endangered
Clover, Showy Indian	Dicot	6	Endangered
Combshell, Southern (=Penitent mussel)	Bivalve	5	Endangered
Combshell, Upland	Bivalve	6	Endangered
Condor, California	Bird	37	Endangered
Coneflower, Smooth	Dicot	27	Endangered
Coneflower, Tennessee Purple	Dicot	1	Endangered
Coot, Hawaiian (=Alae keo keo)	Bird	7	Endangered
Coyote-thistle, Loch Lomond	Dicot	4	Endangered
Crane, Mississippi Sandhill	Bird	1	Endangered
Crane, Whooping	Bird	187	Endangered
Crayfish, Cave (Cambarus aculabrum)	Crustacean	3	Endangered
Crayfish, Cave (Cambarus zophonastes)	Crustacean	1	Endangered
Crayfish, Shasta	Crustacean	4	Endangered
Creeper, Hawaii	Bird	2	Endangered
Creeper, Molokai (Kakawahie)	Bird	2	Endangered
Creeper, Oahu (Alauwahio)	Bird	1	Endangered

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Crow, Hawaiian ('Alala)	Bird	2	Endangered
Crownscale, San Jacinto Valley	Dicot	4	Endangered
Curlew, Eskimo	Bird	4	Endangered
Cyanea undulata (ncn)	Dicot	2	Endangered
Cypress, Santa Cruz	Conf/cycds	2	Endangered
Daisy, Willamette	Dicot	10	Endangered
Dawn-flower, Texas Prairie (=Texas Bitterweed)	Dicot	4	Endangered
Deer, Columbian White-tailed	Mammal	7	Endangered
Delissea rhytodisperma (ncn)	Dicot	2	Endangered
Diellia erecta (ncn)	Ferns	5	Endangered
Diellia falcata (ncn)	Ferns	1	Endangered
Diellia pallida (ncn)	Ferns	2	Endangered
Diellia unisora (ncn)	Ferns	3	Endangered
Diplazium molokaiense (ncn)	Ferns	2	Endangered
Dogweed, Ashy	Dicot	1	Endangered
Dragonfly, Hine's Emerald	Insect	11	Endangered
Dropwort, Canby's	Dicot	26	Endangered
Dubautia latifolia (ncn)	Dicot	2	Endangered
Dubautia pauciflorula (ncn)	Dicot	2	Endangered
Duck, Hawaiian (Koloa)	Bird	5	Endangered
Duck, Laysan	Bird	1	Endangered
Dudleya, Santa Clara Valley	Dicot	20	Endangered
Elepaio, Oahu	Bird	1	Endangered
Evening-primrose, Antioch Dunes	Dicot	9	Endangered
Evening-primrose, Eureka Valley	Dicot	1	Endangered
Fairy Shrimp, Conservancy Fairy	Crustacean	29	Endangered
Fairy Shrimp, Longhorn	Crustacean	19	Endangered
Fairy Shrimp, Riverside	Crustacean	18	Endangered
Fairy Shrimp, San Diego	Crustacean	3	Endangered
Falcon, Northern Aplomado	Bird	46	Endangered
Fanshell	Bivalve	22	Endangered
Fern, Pendant Kihi (Adenophorus periens)	Ferns	6	Endangered
Ferret, Black-footed	Mammal	34	Endangered
Fiddleneck, Large-flowered	Dicot	13	Endangered
Finch, Laysan	Bird	1	Endangered
Finch, Nihoa	Bird	1	Endangered
Flannelbush, Mexican	Dicot	3	Endangered
Flannelbush, Pine Hill	Dicot	3	Endangered
Fly, Delhi Sands Flower-loving	Insect	10	Endangered
Flycatcher, Southwestern Willow	Bird	86	Endangered
Fox, San Joaquin Kit	Mammal	71	Endangered
Fox, San Miguel Island	Mammal	5	Endangered
Fox, Santa Catalina Island	Mammal	6	Endangered
Fox, Santa Cruz Island	Mammal	5	Endangered
Fox, Santa Rosa Island	Mammal	5	Endangered
Frankenia, Johnston's	Dicot	1	Endangered
Fringe Tree, Pygmy	Dicot	6	Endangered
Fringepod, Santa Cruz Island	Dicot	5	Endangered
Fritillary, Gentner's	Monocot	4	Endangered
Frog, Dusky Gopher (Mississippi DPS)	Amphibian	1	Endangered
Frog, Mountain Yellow-legged	Amphibian	14	Endangered
Gahnia Lanaiensis (ncn)	Monocot	2	Endangered
Geranium, Hawaiian Red-flowered	Dicot	2	Endangered
Gerardia, Sandplain	Dicot	2	Endangered
Gilia, Hoffmann's Slender-flowered	Dicot	5	Endangered
Gilia, Monterey	Dicot	2	Endangered
Golden Sunburst, Hartweg's	Dicot	15	Endangered

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Goldenrod, Short's	Dicot	5	Endangered
Goldfields, Burke's	Dicot	11	Endangered
Goldfields, Contra Costa	Dicot	29	Endangered
Goose, Hawaiian (Nene)	Bird	6	Endangered
Gouania hillebrandii (ncn)	Dicot	2	Endangered
Gouania meyenii (ncn)	Dicot	3	Endangered
Gouania vitifolia (ncn)	Dicot	1	Endangered
Gourd, Okeechobee	Dicot	1	Endangered
Grass, California Orcutt	Monocot	12	Endangered
Grass, Eureka Dune	Monocot	1	Endangered
Grass, Fosberg's Love	Monocot	1	Endangered
Grass, Hairy Orcutt	Dicot	42	Endangered
Grass, Sacramento Orcutt	Dicot	6	Endangered
Grass, Solano	Monocot	7	Endangered
Grass, Tennessee Yellow-eyed	Monocot	4	Endangered
Grasshopper, Zayante Band-winged	Insect	1	Endangered
Ground-plum, Guthrie's	Dicot	1	Endangered
Haha (Cyanea acuminata)	Dicot	1	Endangered
Haha (Cyanea asarifolia)	Dicot	2	Endangered
Haha (Cyanea copelandii ssp. copelandii)	Dicot	2	Endangered
Haha (Cyanea copelandii ssp. haleakalaensis)	Dicot	2	Endangered
Haha (Cyanea Crispa) (=Rollandia crispa)	Dicot	1	Endangered
Haha (Cyanea dunbarii)	Dicot	2	Endangered
Haha (Cyanea glabra)	Dicot	2	Endangered
Haha (Cyanea grimesiana ssp. grimesiana)	Dicot	3	Endangered
Haha (Cyanea grimesiana ssp. obatae)	Dicot	1	Endangered
Haha (Cyanea hamatiflora ssp. carlsonii)	Dicot	2	Endangered
Haha (Cyanea hamatiflora ssp. hamatiflora)	Dicot	2	Endangered
Haha (Cyanea humboldtiana)	Dicot	1	Endangered
Haha (Cyanea koolauensis)	Dicot	1	Endangered
Haha (Cyanea longiflora)	Dicot	1	Endangered
Haha (Cyanea Macrostegia var. gibsonii)	Dicot	2	Endangered
Haha (Cyanea mannii)	Dicot	2	Endangered
Haha (Cyanea mceldowneyi)	Dicot	2	Endangered
Haha (Cyanea pinnatifida)	Dicot	1	Endangered
Haha (Cyanea platyphylla)	Dicot	2	Endangered
Haha (Cyanea procera)	Dicot	2	Endangered
Haha (Cyanea remyi)	Dicot	2	Endangered
Haha (Cyanea shipmanii)	Dicot	2	Endangered
Haha (Cyanea stictophylla)	Dicot	2	Endangered
Haha (Cyanea St-Johnii) (=Rollandia St-Johnii)	Dicot	1	Endangered
Haha (Cyanea superba)	Dicot	1	Endangered
Ha'Iwale (Cyrtandra crenata)	Dicot	1	Endangered
Ha'Iwale (Cyrtandra dentata)	Dicot	1	Endangered
Ha'Iwale (Cyrtandra giffardii)	Dicot	2	Endangered
Ha'Iwale (Cyrtandra munroi)	Dicot	2	Endangered
Ha'Iwale (Cyrtandra polyantha)	Dicot	1	Endangered
Ha'Iwale (Cyrtandra subumbellata)	Dicot	1	Endangered
Ha'Iwale (Cyrtandra tintinnabula)	Dicot	1	Endangered
Ha'Iwale (Cyrtandra viridiflora)	Dicot	1	Endangered
Hala Pepe (Pleomele hawaiiensis)	Monocot	2	Endangered
Haplostachys Haplostachya (ncn)	Dicot	2	Endangered
Harebells, Avon Park	Dicot	2	Endangered
Harperella	Dicot	21	Endangered
Harvestman, Bee Creek Cave	Arachnid	4	Endangered
Harvestman, Bone Cave	Arachnid	2	Endangered
Harvestman, Robber Baron Cave	Arachnid	1	Endangered

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Hau Kauhiwi (Hibiscadelphus woodi)	Dicot	2	Endangered
Hau Kuahiwi (Hibiscadelphus distans)	Dicot	2	Endangered
Hawk, Hawaiian (Io)	Bird	2	Endangered
Heau (Exocarpos luteolus)	Dicot	2	Endangered
Hedyotis degeneri (ncn)	Dicot	1	Endangered
Hedyotis parvula (ncn)	Dicot	1	Endangered
Hedyotis St.-Johnii (ncn)	Dicot	2	Endangered
Hesperomannia arborescens (ncn)	Dicot	3	Endangered
Hesperomannia arbuscula (ncn)	Dicot	3	Endangered
Hesperomannia lydgatei (ncn)	Dicot	2	Endangered
Hibiscus, Clay's	Dicot	2	Endangered
Hilo Ischaemum (Ischaemum byrone)	Monocot	6	Endangered
Holei (Ochrosia kilaueaensis)	Dicot	2	Endangered
Honeycreeper, Crested ('Akohekohe)	Bird	2	Endangered
Hypericum, Highlands Scrub	Dicot	2	Endangered
'Ihi'Ihi (Marsilea villosa)	Ferns	3	Endangered
Iliau (Wilkesia hobdyi)	Dicot	2	Endangered
Irisette, White	Monocot	2	Endangered
Isopod, Lee County Cave	Crustacean	3	Endangered
Jacquemontia, Beach	Dicot	4	Endangered
Jaguar	Mammal	15	Endangered
Jaguarundi, Gulf Coast	Mammal	19	Endangered
Jaguarundi, Sinaloan	Mammal	15	Endangered
Jewelflower, California	Dicot	30	Endangered
Jewelflower, Tiburon	Dicot	2	Endangered
Kamakahala (Labordia cyrtandrae)	Dicot	1	Endangered
Kamakahala (Labordia lydgatei)	Dicot	2	Endangered
Kamakahala (Labordia tinifolia var. lanaiensis)	Dicot	2	Endangered
Kamakahala (Labordia tinifolia var. wahiawaen)	Dicot	2	Endangered
Kamakahala (Labordia triflora)	Dicot	2	Endangered
Kamanomano (Cenchrus agrimonioides)	Monocot	3	Endangered
Kanaloa kahoolawensis (ncn)	Dicot	2	Endangered
Kangaroo Rat, Fresno	Mammal	21	Endangered
Kangaroo Rat, Giant	Mammal	40	Endangered
Kangaroo Rat, Morro Bay	Mammal	5	Endangered
Kangaroo Rat, San Bernardino Merriam's	Mammal	8	Endangered
Kangaroo Rat, Stephens'	Mammal	11	Endangered
Kangaroo Rat, Tipton	Mammal	15	Endangered
Kauila (Colubrina oppositifolia)	Dicot	2	Endangered
Kaulu (Pteralyxia kauaiensis)	Dicot	2	Endangered
Kidneyshell, Triangular	Bivalve	11	Endangered
Kio'Ele (Hedyotis coriacea)	Dicot	4	Endangered
Kiponapona (Phyllostegia racemosa)	Dicot	2	Endangered
Kite, Everglade Snail	Bird	18	Endangered
Koki'o (Kokia drynarioides)	Dicot	2	Endangered
Koki'o (Kokia kauaiensis)	Dicot	2	Endangered
Koki'o Ke'oke'o (Hibiscus arnottianus ssp. immaculatus)	Dicot	2	Endangered
Koki'o Ke'oke'o (Hibiscus waimeae ssp. hannerae)	Dicot	2	Endangered
Kolea (Myrsine juddii)	Dicot	1	Endangered
Ko'oko'olau (Bidens micrantha ssp. kalealaha)	Dicot	2	Endangered
Ko'oko'olau (Bidens wiebkei)	Dicot	2	Endangered
Ko'oloa'ula (Abutilon menziesii)	Dicot	4	Endangered
Kopa (Hedyotis schlechtendahliana var. remyi)	Dicot	2	Endangered
Kuawawaenohu (Alsinidendron lychnoides)	Dicot	2	Endangered
Kulu'I (Nototrichium humile)	Dicot	3	Endangered
Ladies'-tresses, Canelo Hills	Monocot	4	Endangered
Ladies'-tresses, Navasota	Monocot	15	Endangered

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Larkspur, Baker's	Dicot	6	Endangered
Larkspur, San Clemente Island	Dicot	6	Endangered
Larkspur, Yellow	Dicot	6	Endangered
Lau'ehu (Panicum niihauense)	Monocot	2	Endangered
Laukahi Kuahiwi (Plantago hawaiensis)	Dicot	2	Endangered
Laukahi Kuahiwi (Plantago princeps)	Dicot	5	Endangered
Laulihilihi (Schiedea stellarioides)	Dicot	2	Endangered
Layia, Beach	Dicot	13	Endangered
Lead-plant, Crenulate	Dicot	2	Endangered
Leather-flower, Alabama	Dicot	2	Endangered
Leather-flower, Morefield's	Dicot	1	Endangered
Lessingia, San Francisco	Dicot	1	Endangered
Lily, Minnesota Trout	Monocot	1	Endangered
Lily, Pitkin Marsh	Monocot	4	Endangered
Lily, Western	Monocot	6	Endangered
Lipochaeta venosa (ncn)	Dicot	2	Endangered
Liveforever, Santa Barbara Island	Dicot	5	Endangered
Lizard, Blunt-nosed Leopard	Reptile	54	Endangered
Lo`ulu (Pritchardia affinis)	Monocot	2	Endangered
Lo`ulu (Pritchardia kaalae)	Monocot	1	Endangered
Lo`ulu (Pritchardia munroi)	Monocot	2	Endangered
Lo`ulu (Pritchardia napaliensis)	Monocot	2	Endangered
Lo`ulu (Pritchardia remota)	Monocot	1	Endangered
Lo`ulu (Pritchardia schattaueri)	Monocot	2	Endangered
Lo`ulu (Pritchardia viscosa)	Monocot	2	Endangered
Lobelia monostachya (ncn)	Dicot	1	Endangered
Lobelia niihauensis (ncn)	Dicot	3	Endangered
Lobelia oahuensis (ncn)	Dicot	1	Endangered
Lomatium, Bradshaw's	Dicot	10	Endangered
Lomatium, Cook's	Dicot	4	Endangered
Loosestrife, Rough-leaved	Dicot	22	Endangered
Lupine, Clover	Dicot	13	Endangered
Lupine, Nipomo Mesa	Dicot	5	Endangered
Lupine, Scrub	Dicot	2	Endangered
Lysimachia filifolia (ncn)	Dicot	3	Endangered
Lysimachia lydgatei (ncn)	Dicot	3	Endangered
Lysimachia maxima (ncn)	Dicot	2	Endangered
Mahoe (Alectryon macrococcus)	Dicot	5	Endangered
Malacothrix, Island	Dicot	5	Endangered
Malacothrix, Santa Cruz Island	Dicot	10	Endangered
Mallow, Kern	Dicot	5	Endangered
Manioc, Walker's	Dicot	1	Endangered
Manzanita, Del Mar	Dicot	3	Endangered
Manzanita, Santa Rosa Island	Dicot	5	Endangered
Ma'o Hau Hele (Hibiscus brackenridgei)	Dicot	5	Endangered
Ma'oli'oli (Schiedea apokremnos)	Dicot	2	Endangered
Ma'oli'oli (Schiedea kealiae)	Dicot	1	Endangered
Mapele (Cyrtandra cyaneoides)	Dicot	2	Endangered
Mariscus fauriei (ncn)	Monocot	4	Endangered
Mariscus pennatiformis (ncn)	Monocot	7	Endangered
Meadowfoam, Butte County	Dicot	10	Endangered
Meadowfoam, Large-flowered Woolly	Dicot	2	Endangered
Meadowfoam, Sebastopol	Dicot	4	Endangered
Meadowrue, Cooley's	Dicot	5	Endangered
Mehamehame (Flueggea neowawraea)	Dicot	7	Endangered
Meshweaver, Braken Bat Cave	Arachnid	1	Endangered
Milkpea, Small's	Dicot	2	Endangered

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Milk-vetch, Braunton's	Dicot	11	Endangered
Milk-vetch, Clara Hunt's	Dicot	8	Endangered
Milk-vetch, Coachella Valley	Dicot	4	Endangered
Milk-vetch, Coastal Dunes	Dicot	2	Endangered
Milk-vetch, Cushenbury	Dicot	4	Endangered
Milk-vetch, Holmgren	Dicot	8	Endangered
Milk-vetch, Jesup's	Dicot	1	Endangered
Milk-vetch, Lane Mountain	Dicot	4	Endangered
Milk-vetch, Shivwits	Dicot	4	Endangered
Milk-vetch, Triple-ribbed	Dicot	8	Endangered
Milk-vetch, Ventura Marsh	Dicot	10	Endangered
Millerbird, Nihoa	Bird	1	Endangered
Mint, Garrett's	Dicot	1	Endangered
Mint, Longspurred	Dicot	1	Endangered
Mint, Otay Mesa	Dicot	7	Endangered
Mint, San Diego Mesa	Dicot	3	Endangered
Mint, Scrub	Dicot	1	Endangered
Monardella, Willowy	Dicot	3	Endangered
Monkey-flower, Michigan	Dicot	2	Endangered
Moorhen, Hawaiian Common	Bird	5	Endangered
Morning-glory, Stebbins	Dicot	3	Endangered
Moth, Blackburn's Sphinx	Insect	4	Endangered
Mountain Beaver, Point Arena	Mammal	3	Endangered
Mountainbalm, Indian Knob	Dicot	5	Endangered
Mountain-mahogany, Catalina Island	Dicot	6	Endangered
Mouse, Alabama Beach	Mammal	1	Endangered
Mouse, Choctawhatchee Beach	Mammal	3	Endangered
Mouse, Pacific Pocket	Mammal	9	Endangered
Mouse, Perdido Key Beach	Mammal	2	Endangered
Mouse, Salt Marsh Harvest	Mammal	26	Endangered
Mucket, Pink (Pearlymussel)	Bivalve	64	Endangered
Munroidendron racemosum (ncn)	Dicot	2	Endangered
Mussel, Acornshell Southern	Bivalve	4	Endangered
Mussel, Black (=Curtus' Mussel) Clubshell	Bivalve	3	Endangered
Mussel, Clubshell	Bivalve	16	Endangered
Mussel, Coosa Moccasinshell	Bivalve	5	Endangered
Mussel, Cumberland Combshell	Bivalve	7	Endangered
Mussel, Cumberland Elktoe	Bivalve	2	Endangered
Mussel, Dark Pigtoe	Bivalve	4	Endangered
Mussel, Dwarf Wedge	Bivalve	25	Endangered
Mussel, Fine-rayed Pigtoe	Bivalve	7	Endangered
Mussel, Flat Pigtoe (=Marshall's Mussel)	Bivalve	1	Endangered
Mussel, Gulf Moccasinshell	Bivalve	23	Endangered
Mussel, Heavy Pigtoe (=Judge Tait's Mussel)	Bivalve	10	Endangered
Mussel, Heelsplitter Carolina	Bivalve	9	Endangered
Mussel, Ochlockonee Moccasinshell	Bivalve	5	Endangered
Mussel, Oval Pigtoe	Bivalve	33	Endangered
Mussel, Ovate Clubshell	Bivalve	19	Endangered
Mussel, Oyster	Bivalve	7	Endangered
Mussel, Ring Pink (=Golf Stick Pearly)	Bivalve	14	Endangered
Mussel, Rough Pigtoe	Bivalve	13	Endangered
Mussel, Scaleshell	Bivalve	29	Endangered
Mussel, Shiny Pigtoe	Bivalve	7	Endangered
Mussel, Shiny-rayed Pocketbook	Bivalve	27	Endangered
Mussel, Southern Clubshell	Bivalve	19	Endangered
Mussel, Southern Pigtoe	Bivalve	6	Endangered
Mussel, Speckled Pocketbook	Bivalve	1	Endangered

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Mussel, Winged Mapleleaf	Bivalve	4	Endangered
Mustard, Carter's	Dicot	2	Endangered
Mustard, Slender-petaled	Dicot	4	Endangered
Na'ena'e (Dubautia herbstobatae)	Dicot	1	Endangered
Na'ena'e (Dubautia plantaginea ssp. humilis)	Dicot	2	Endangered
Nani Wai'ale'ale (Viola kauaensis var. wahiawaensis)	Dicot	2	Endangered
Nanu (Gardenia mannii)	Dicot	1	Endangered
Na'u (Gardenia brighamii)	Dicot	3	Endangered
Naupaka, Dwarf (Scaevola coriacea)	Dicot	2	Endangered
Navarretia, Few-flowered	Dicot	27	Endangered
Navarretia, Many-flowered	Dicot	27	Endangered
Nehe (*Lipochaeta fauriei*)	Dicot	2	Endangered
Nehe (Lipochaeta kamolensis)	Dicot	2	Endangered
Nehe (Lipochaeta lobata var. leptophylla)	Dicot	1	Endangered
Nehe (Lipochaeta micrantha)	Dicot	2	Endangered
Nehe (Lipochaeta tenuifolia)	Dicot	1	Endangered
Nehe (Lipochaeta waimeaensis)	Dicot	2	Endangered
Neraudia angulata (ncn)	Dicot	1	Endangered
Neraudia ovata (ncn)	Dicot	2	Endangered
Neraudia sericea (ncn)	Dicot	4	Endangered
Nioi (Eugenia koolauensis)	Dicot	1	Endangered
Niterwort, Amargosa	Dicot	4	Endangered
Nohoanu (Geranium multiflorum)	Dicot	4	Endangered
Nuku Pu'u	Bird	4	Endangered
Ocelot	Mammal	28	Endangered
'Oha (Delissea rivularis)	Dicot	2	Endangered
'Oha (Delissea subcordata)	Dicot	1	Endangered
'Oha (Delissea undulata)	Dicot	2	Endangered
'Oha (Lobelia gaudichaudii koolauensis)	Dicot	1	Endangered
'Oha Wai (Clermontia drepanomorpha)	Dicot	2	Endangered
'Oha Wai (Clermontia lindseyana)	Dicot	4	Endangered
'Oha Wai (Clermontia oblongifolia ssp. brevipes)	Dicot	2	Endangered
'Oha Wai (Clermontia oblongifolia ssp. mauiensis)	Dicot	2	Endangered
'Oha Wai (Clermontia peleana)	Dicot	2	Endangered
'Oha Wai (Clermontia pyrularia)	Dicot	2	Endangered
'Oha Wai (Clermontia samuelii)	Dicot	2	Endangered
'Ohai (Sesbania tomentosa)	Dicot	7	Endangered
'Ohe'ohe (Tetraplasandra gymnocarpa)	Dicot	1	Endangered
'Olulu (Brighamia insignis)	Dicot	2	Endangered
Onion, Munz's	Monocot	4	Endangered
'O'o, Kauai (='A'a)	Bird	2	Endangered
Opuhe (Urera kaalae)	Dicot	1	Endangered
'O'u (Honeycreeper)	Bird	4	Endangered
Oxytheca, Cushenbury	Dicot	4	Endangered
Paintbrush, San Clemente Island Indian	Dicot	6	Endangered
Paintbrush, Soft-leaved	Dicot	5	Endangered
Paintbrush, Tiburon	Dicot	10	Endangered
Palila	Bird	2	Endangered
Pamakani (Viola chamissoniana ssp. chamissoniana)	Dicot	1	Endangered
Panicgrass, Carter's (Panicum fauriei var.carteri)	Monocot	3	Endangered
Panther, Florida	Mammal	11	Endangered
Parrotbill, Maui	Bird	2	Endangered
Pauoa (Ctenitis squamigera)	Ferns	3	Endangered
Pawpaw, Beautiful	Dicot	4	Endangered
Pawpaw, Four-petal	Dicot	2	Endangered
Pawpaw, Rugel's	Dicot	1	Endangered
Pearlymussel, Alabama Lamp	Bivalve	2	Endangered

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Pearlymussel, Appalachian Monkeyface	Bivalve	4	Endangered
Pearlymussel, Birdwing	Bivalve	4	Endangered
Pearlymussel, Cracking	Bivalve	7	Endangered
Pearlymussel, Cumberland Bean	Bivalve	8	Endangered
Pearlymussel, Cumberland Monkeyface	Bivalve	4	Endangered
Pearlymussel, Curtis'	Bivalve	6	Endangered
Pearlymussel, Dromedary	Bivalve	6	Endangered
Pearlymussel, Fat Pocketbook	Bivalve	30	Endangered
Pearlymussel, Higgins' Eye	Bivalve	17	Endangered
Pearlymussel, Little-wing	Bivalve	13	Endangered
Pearlymussel, Orange-footed	Bivalve	14	Endangered
Pearlymussel, Pale Lilliput	Bivalve	1	Endangered
Pearlymussel, Purple Cat's Paw	Bivalve	3	Endangered
Pearlymussel, Tubercled-blossom	Bivalve	6	Endangered
Pearlymussel, Turgid-blossom	Bivalve	2	Endangered
Pearlymussel, White Cat's Paw	Bivalve	1	Endangered
Pearlymussel, White Wartyback	Bivalve	6	Endangered
Pearlymussel, Yellow-blossom	Bivalve	3	Endangered
Pebblesnail, Flat	Gastropod	2	Endangered
Pelican, Brown	Bird	105	Endangered
Penny-cress, Kneeland Prairie	Dicot	4	Endangered
Pennyroyal, Todsen's	Dicot	4	Endangered
Pentachaeta, Lyon's	Dicot	11	Endangered
Pentachaeta, White-rayed	Dicot	4	Endangered
Petrel, Hawaiian Dark-rumped	Bird	6	Endangered
Phacelia, Clay	Dicot	1	Endangered
Phacelia, Island	Dicot	5	Endangered
Phlox, Texas Trailing	Dicot	3	Endangered
Phlox, Yreka	Dicot	3	Endangered
Phyllostegia hirsuta (ncn)	Dicot	1	Endangered
Phyllostegia kaalaensis (ncn)	Dicot	1	Endangered
Phyllostegia knudsenii (ncn)	Dicot	2	Endangered
Phyllostegia mannii (ncn)	Dicot	2	Endangered
Phyllostegia mollis (ncn)	Dicot	3	Endangered
Phyllostegia parviflora (ncn)	Dicot	1	Endangered
Phyllostegia velutina (ncn)	Dicot	2	Endangered
Phyllostegia waimeae (ncn)	Dicot	2	Endangered
Phyllostegia warshaueri (ncn)	Dicot	2	Endangered
Phyllostegia wawrana (ncn)	Dicot	2	Endangered
Pilo (Hedyotis mannii)	Dicot	2	Endangered
Pinkroot, Gentian	Dicot	3	Endangered
Piperia, Yadon's	Monocot	2	Endangered
Pitaya, Davis' Green	Dicot	1	Endangered
Pitcher-plant, Alabama Canebrake	Dicot	3	Endangered
Pitcher-plant, Green	Dicot	7	Endangered
Pitcher-plant, Mountain Sweet	Dicot	1	Endangered
Platanthera holochila (ncn)	Monocot	4	Endangered
Plover, Piping	Bird	177	Endangered
Plum, Scrub	Dicot	5	Endangered
Poa siphonoglossa (ncn)	Monocot	2	Endangered
Po'e (Portulaca sclerocarpa)	Dicot	4	Endangered
Polygala, Lewton's	Dicot	6	Endangered
Polygala, Tiny	Dicot	5	Endangered
Polygonum, Scott's Valley	Dicot	1	Endangered
Pondberry	Dicot	22	Endangered
Pondweed, Little Aguja Creek	Monocot	2	Endangered
Po'ouli	Bird	2	Endangered

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Popcornflower, Rough	Dicot	2	Endangered
Popolo 'Aiakeakua (Solanum sandwicense)	Dicot	3	Endangered
Popolo Ku Mai (Solanum incompletum)	Dicot	2	Endangered
Poppy, Sacramento Prickly	Dicot	2	Endangered
Poppy-mallow, Texas	Dicot	3	Endangered
Potentilla, Hickman's	Dicot	3	Endangered
Prairie-chicken, Attwater's Greater	Bird	10	Endangered
Pronghorn, Sonoran	Mammal	8	Endangered
Pseudoscorpion, Tooth Cave	Arachnid	1	Endangered
Pteris lidgatei (ncn)	Ferns	3	Endangered
Pua'ala (Brighamia rockii)	Dicot	2	Endangered
Purple Bean	Bivalve	6	Endangered
Pu'uka'a (Cyperus trachysanthos)	Monocot	3	Endangered
Pygmy-owl, Cactus Ferruginous	Bird	20	Endangered
Quillwort, Black-spored	Ferns	8	Endangered
Quillwort, Louisiana	Ferns	17	Endangered
Quillwort, Mat-forming	Ferns	5	Endangered
Rabbit, Pygmy	Mammal	7	Endangered
Rabbit, Riparian Brush	Mammal	6	Endangered
Rabbitsfoot, Rough	Bivalve	4	Endangered
Rail, California Clapper	Bird	33	Endangered
Rail, Light-footed Clapper	Bird	19	Endangered
Rail, Yuma Clapper	Bird	26	Endangered
Rattleweed, Hairy	Dicot	2	Endangered
Reed-mustard, Barneby	Dicot	1	Endangered
Reed-mustard, Shrubby	Dicot	1	Endangered
Remya kauaiensis (ncn)	Dicot	2	Endangered
Remya montgomeryi (ncn)	Dicot	2	Endangered
Remya, Maui	Dicot	2	Endangered
Rhadine exilis (ncn)	Insect	1	Endangered
Rhadine infernalis (ncn)	Insect	1	Endangered
Rhododendron, Chapman	Dicot	5	Endangered
Ridge-cress (=Pepper-cress), Barneby	Dicot	1	Endangered
Riffleshell, Northern	Bivalve	5	Endangered
Riffleshell, Tan	Bivalve	9	Endangered
Riversnail, Anthony's	Gastropod	1	Endangered
Rock-cress, Hoffmann's	Dicot	5	Endangered
Rock-cress, Large (=Braun's)	Dicot	2	Endangered
Rock-cress, McDonald's	Dicot	3	Endangered
Rock-cress, Santa Cruz Island	Dicot	6	Endangered
Rock-cress, Shale Barren	Dicot	3	Endangered
Rock-cress, Small	Dicot	1	Endangered
Rock-pocketbook, Ouachita (=Wheeler's pm)	Bivalve	6	Endangered
Rocksnail, Plicate	Gastropod	1	Endangered
Rosemary, Apalachicola	Dicot	1	Endangered
Rosemary, Etonia	Dicot	2	Endangered
Rosemary, Short-leaved	Dicot	2	Endangered
Rush-pea, Slender	Dicot	1	Endangered
Salamander, Barton Springs	Amphibian	2	Endangered
Salamander, California Tiger	Amphibian	87	Endangered
Salamander, Desert Slender	Amphibian	4	Endangered
Salamander, Santa Cruz Long-toed	Amphibian	3	Endangered
Salamander, Shenandoah	Amphibian	3	Endangered
Salamander, Sonora Tiger	Amphibian	4	Endangered
Salamander, Texas Blind	Amphibian	6	Endangered
Sandalwood, Lanai (='Iliahi)	Dicot	2	Endangered
Sandlace	Dicot	4	Endangered

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Sand-verbena, Large-fruited	Dicot	3	Endangered
Sandwort, Cumberland	Dicot	1	Endangered
Sandwort, Marsh	Dicot	5	Endangered
Sanicula mariversa (ncn)	Dicot	1	Endangered
Sanicula purpurea (ncn)	Dicot	2	Endangered
Schiedea haleakalensis (ncn)	Dicot	2	Endangered
Schiedea helleri (ncn)	Dicot	2	Endangered
Schiedea hookeri (ncn)	Dicot	1	Endangered
Schiedea kaalae (ncn)	Dicot	1	Endangered
Schiedea kauaiensis (ncn)	Dicot	2	Endangered
Schiedea lydgatei (ncn)	Dicot	2	Endangered
Schiedea membranacea (ncn)	Dicot	2	Endangered
Schiedea nuttallii (ncn)	Dicot	3	Endangered
Schiedea sarmentosa (ncn)	Dicot	2	Endangered
Schiedea spergulina var. leiopoda (ncn)	Dicot	2	Endangered
Schiedea verticillata (ncn)	Dicot	1	Endangered
Schiedea, Diamond Head (Schiedea adamantis)	Dicot	1	Endangered
Sea turtle, green	Reptile	60	Endangered
Sea turtle, hawksbill	Reptile	36	Endangered
Sea turtle, Kemp's ridley	Reptile	36	Endangered
Sea turtle, leatherback	Reptile	55	Endangered
Sea-blite, California	Dicot	5	Endangered
Sedge, Golden	Monocot	1	Endangered
Sedge, White	Monocot	4	Endangered
Sheep, Peninsular Bighorn	Mammal	10	Endangered
Sheep, Sierra Nevada Bighorn	Mammal	4	Endangered
Shrew, Buena Vista Lake Ornate	Mammal	5	Endangered
Shrike, San Clemente Loggerhead	Bird	6	Endangered
Shrimp, Alabama Cave	Crustacean	1	Endangered
Shrimp, California Freshwater	Crustacean	10	Endangered
Silene alexandri (ncn)	Dicot	2	Endangered
Silene lanceolata (ncn)	Dicot	7	Endangered
Silene perlmanii (ncn)	Dicot	1	Endangered
Silversword, Ka'u (Argyroxiphium kauense)	Dicot	2	Endangered
Silversword, Mauna Kea ('Ahinahina)	Dicot	4	Endangered
Skipper, Laguna Mountain	Insect	3	Endangered
Snail, Iowa Pleistocene	Gastropod	6	Endangered
Snail, Lioplax Cylindrical	Gastropod	2	Endangered
Snail, Morro Shoulderband	Gastropod	5	Endangered
Snail, O'ahu Tree (Achatinella abbreviata)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella apexfulva)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella bellula)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella buddii)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella bulimoides)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella byronii)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella caesia)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella casta)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella cestus)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella concavospira)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella curta)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella decipiens)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella decora)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella dimorpha)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella elegans)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella fulgens)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella fuscobasis)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella juddii)	Gastropod	1	Endangered

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Snail, O'ahu Tree (Achatinella juncea)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella lehuiensis)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella leucorraphe)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella lila)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella livida)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella lorata)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella mustelina)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella papyracea)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella phaeozona)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella pulcherrima)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella pupukanioe)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella rosea)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella sowerbyana)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella spaldingi)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella stewartii)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella swiftii)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella taeniolata)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella thaanumi)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella turgida)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella valida)	Gastropod	1	Endangered
Snail, Pecos Assiminea	Gastropod	5	Endangered
Snail, Tulotoma	Gastropod	5	Endangered
Snail, Virginia Fringed Mountain	Gastropod	1	Endangered
Snake, San Francisco Garter	Reptile	2	Endangered
Snakeroot	Dicot	3	Endangered
Snowbells, Texas	Dicot	7	Endangered
Sparrow, Cape Sable Seaside	Bird	2	Endangered
Sparrow, Florida Grasshopper	Bird	5	Endangered
Spermolepis hawaiiensis (ncn)	Dicot	7	Endangered
Spider, Government Canyon Cave	Arachnid	1	Endangered
Spider, Kauai Cave Wolf	Arachnid	2	Endangered
Spider, Madla's Cave	Arachnid	1	Endangered
Spider, Robber Baron Cave	Arachnid	1	Endangered
Spider, Tooth Cave	Arachnid	1	Endangered
Spider, Vesper Cave	Arachnid	1	Endangered
Spineflower, Ben Lomond	Dicot	1	Endangered
Spineflower, Howell's	Dicot	3	Endangered
Spineflower, Orcutt's	Dicot	3	Endangered
Spineflower, Robust	Dicot	3	Endangered
Spineflower, Scotts Valley	Dicot	1	Endangered
Spineflower, Slender-horned	Dicot	17	Endangered
Spineflower, Sonoma	Dicot	6	Endangered
Spinymussel, James River	Bivalve	11	Endangered
Spinymussel, Tar River	Bivalve	6	Endangered
Springsnail, Koster's	Gastropod	2	Endangered
Springsnail, Roswell	Gastropod	2	Endangered
Spurge, Deltoid	Dicot	2	Endangered
Squirrel, Carolina Northern Flying	Mammal	1	Endangered
Squirrel, Mount Graham Red	Mammal	3	Endangered
Squirrel, Virginia Northern Flying	Mammal	1	Endangered
Starling, Ponape Mountain	Bird	1	Endangered
Stenogyne angustifolia (ncn)	Dicot	2	Endangered
Stenogyne bifida (ncn)	Dicot	2	Endangered
Stenogyne campanulata (ncn)	Dicot	2	Endangered
Stenogyne kanehoana (ncn)	Dicot	1	Endangered
Stickseed, Showy	Dicot	3	Endangered
Stickyseed, Baker's	Dicot	4	Endangered

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Stilt, Hawaiian (=Ae'o)	Bird	7	Endangered
Stirrupshell	Bivalve	4	Endangered
Stonecrop, Lake County	Dicot	27	Endangered
Stork, Wood	Bird	190	Endangered
Sumac, Michaux's	Dicot	21	Endangered
Sunflower, San Mateo Woolly	Dicot	1	Endangered
Sunflower, Schweinitz's	Dicot	13	Endangered
Tadpole Shrimp, Vernal Pool	Crustacean	99	Endangered
Taraxacum, California	Dicot	4	Endangered
Tarplant, Gaviota	Dicot	5	Endangered
Tern, California Least	Bird	39	Endangered
Tern, Interior (population) Least	Bird	175	Endangered
Tern, Roseate	Bird	6	Endangered
Tetramolopium arenarium (ncn)	Dicot	2	Endangered
Tetramolopium capillare (ncn)	Dicot	2	Endangered
Tetramolopium filiforme (ncn)	Dicot	1	Endangered
Tetramolopium lepidotum ssp. lepidotum (ncn)	Dicot	1	Endangered
Tetramolopium remyi (ncn)	Dicot	2	Endangered
Thistle, Chorro creek Bog	Dicot	5	Endangered
Thistle, Fountain	Dicot	10	Endangered
Thistle, La Graciosa	Dicot	10	Endangered
Thistle, Suisun	Dicot	4	Endangered
Thornmint, San Mateo	Dicot	1	Endangered
Threeridge, Fat (Mussel)	Bivalve	6	Endangered
Thrush, Large Kauai	Bird	2	Endangered
Thrush, Molokai (Oloma'o)	Bird	2	Endangered
Thrush, Small Kauai (Puaiohi)	Bird	2	Endangered
Toad, Arroyo Southwestern	Amphibian	31	Endangered
Toad, Houston	Amphibian	16	Endangered
Torreya, Florida	Conf/cycds	6	Endangered
Trematolobelia singularis (ncn)	Dicot	1	Endangered
Trillium, Persistent	Monocot	2	Endangered
Trillium, Relict	Monocot	15	Endangered
Tuctoria, Green's	Dicot	42	Endangered
Turtle, Alabama Red-bellied	Reptile	2	Endangered
Uhiuhi (Caesalpinia kavaiensis)	Dicot	5	Endangered
Ulihi (Phyllostegia glabra var. lanaiensis)	Dicot	2	Endangered
Umbel, Huachuca Water	Dicot	6	Endangered
Vetch, Hawaiian (Vicia menziesii)	Dicot	2	Endangered
Vigna o-wahuensis (ncn)	Dicot	6	Endangered
Viola helenae (ncn)	Dicot	2	Endangered
Viola lanaiensis (ncn)	Dicot	2	Endangered
Viola oahuensis (ncn)	Dicot	1	Endangered
Vireo, Black-capped	Bird	80	Endangered
Vireo, Least Bell's	Bird	40	Endangered
Vole, Amargosa	Mammal	5	Endangered
Vole, Florida Salt Marsh	Mammal	2	Endangered
Vole, Hualapai Mexican	Mammal	4	Endangered
Wahane (Pritchardia aylmer-robinsonii)	Monocot	2	Endangered
Wahine Noho Kula (Isodendrion pyrifolium)	Dicot	2	Endangered
Wallflower, Ben Lomond	Dicot	1	Endangered
Wallflower, Contra Costa	Dicot	4	Endangered
Wallflower, Menzie's	Dicot	9	Endangered
Warbler (=Wood), Golden-cheeked	Bird	44	Endangered
Warbler (=Wood), Kirtland's	Bird	8	Endangered
Warbler, Bachman's	Bird	5	Endangered
Warea, Wide-leaf	Dicot	4	Endangered

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Watercress, Gambel's	Dicot	23	Endangered
Wawae'Iole (Phlegmariurus (=Huperzia) mannii)	Ferns	4	Endangered
Wawae'Iole (Phlegmariurus (=Lycopodium) nutans)	Ferns	1	Endangered
Wild-rice, Texas	Monocot	6	Endangered
Wireweed	Dicot	2	Endangered
Wolf, Gray	Mammal	34	Endangered
Woodland-star, San Clemente Island	Dicot	6	Endangered
Woodpecker, Ivory-billed	Bird	3	Endangered
Woodpecker, Red-cockaded	Bird	374	Endangered
Woodrat, Riparian	Mammal	6	Endangered
Woolly-star, Santa Ana River	Dicot	8	Endangered
Woolly-threads, San Joaquin	Dicot	32	Endangered
Xylosma crenatum (ncn)	Dicot	2	Endangered
Yerba Santa, Lompoc	Dicot	5	Endangered
Ziziphus, Florida	Dicot	2	Endangered
Adobe Sunburst, San Joaquin	Dicot	15	Threatened
Amaranth, Seabeach	Dicot	9	Threatened
Amole, Cammatta Canyon	Monocot	5	Threatened
Amole, Purple	Monocot	7	Threatened
Amphianthus, Little	Dicot	18	Threatened
Aster, Decurrent False	Dicot	18	Threatened
Aupaka (Isodendrion longifolium)	Dicot	3	Threatened
Baccharis, Encinitas	Dicot	3	Threatened
Bankclimber, Purple	Bivalve	20	Threatened
Barbara Buttons, Mohr's	Dicot	5	Threatened
Bear, Grizzly	Mammal	18	Threatened
Bear, Louisiana Black	Mammal	104	Threatened
Beetle, Delta Green Ground	Insect	4	Threatened
Beetle, Northeastern Beach Tiger	Insect	3	Threatened
Beetle, Puritan Tiger	Insect	1	Threatened
Beetle, Valley Elderberry Longhorn	Insect	77	Threatened
Birds-in-a-nest, White	Dicot	3	Threatened
Bladderpod, Lyrate	Dicot	3	Threatened
Bladderpod, Missouri	Dicot	9	Threatened
Blazing Star, Ash Meadows	Dicot	3	Threatened
Blazing Star, Heller's	Dicot	1	Threatened
Bluecurls, Hidden Lake	Dicot	4	Threatened
Bonamia, Florida	Dicot	11	Threatened
Brodiaea, Chinese Camp	Monocot	1	Threatened
Brodiaea, Thread-leaved	Monocot	17	Threatened
Buckwheat, Scrub	Dicot	7	Threatened
Buckwheat, Southern Mountain Wild	Dicot	4	Threatened
Butterfly, Bay Checkerspot (Wright's euphydryas)	Insect	12	Threatened
Butterfly, Oregon Silverspot	Insect	5	Threatened
Butterweed, Layne's	Dicot	4	Threatened
Butterwort, Godfrey's	Dicot	3	Threatened
Cactus, Bunched Cory	Dicot	1	Threatened
Cactus, Chisos Mountain Hedgehog	Dicot	1	Threatened
Cactus, Cochise Pincushion	Dicot	4	Threatened
Cactus, Lee Pincushion	Dicot	1	Threatened
Cactus, Lloyd's Mariposa	Dicot	2	Threatened
Cactus, Siler Pincushion	Dicot	9	Threatened
Cactus, Uinta Basin Hookless	Dicot	1	Threatened
Cactus, Winkler	Dicot	1	Threatened
Caracara, Audubon's Crested	Bird	11	Threatened
Catchfly, Spalding's	Dicot	5	Threatened
Ceanothus, Vail Lake	Dicot	4	Threatened

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Centaury, Spring-loving	Dicot	4	Threatened
Checker-mallow, Nelson's	Dicot	18	Threatened
Clarkia, Springville	Dicot	5	Threatened
Clover, Fleshy Owl's	Dicot	30	Threatened
Clover, Prairie Bush	Dicot	41	Threatened
Crocodile, American	Reptile	5	Threatened
Crownbeard, Big-leaved	Dicot	3	Threatened
Cycladenia, Jones	Dicot	5	Threatened
Cypress, Gowen	Conf/cycds	2	Threatened
Daisy, Lakeside	Dicot	2	Threatened
Daisy, Maguire	Dicot	1	Threatened
Daisy, Parish's	Dicot	8	Threatened
Dudleya, Conejo	Dicot	5	Threatened
Dudleya, Marcescent	Dicot	11	Threatened
Dudleya, Santa Cruz Island	Dicot	5	Threatened
Dudleya, Santa Monica Mountains	Dicot	11	Threatened
Dudleya, Verity's	Dicot	5	Threatened
Dwarf-flax, Marin	Dicot	2	Threatened
Elimia, Lacy	Gastropod	1	Threatened
Evening-primrose, San Benito	Dicot	2	Threatened
Fairy Shrimp, Vernal Pool	Crustacean	117	Threatened
Fatmucket, Arkansas	Bivalve	2	Threatened
Fern, Alabama Streak-sorus	Ferns	1	Threatened
Fern, American hart's-tongue	Ferns	4	Threatened
Four-o'clock, Macfarlane's	Dicot	1	Threatened
Frog, California Red-legged	Amphibian	83	Threatened
Frog, Chiricahua Leopard	Amphibian	20	Threatened
Fruit, Earth (=geocarpon)	Dicot	16	Threatened
Gnatcatcher, Coastal California	Bird	22	Threatened
Goldenrod, Houghton's	Dicot	1	Threatened
Gooseberry, Miccosukee	Dicot	4	Threatened
Grass, Colusa	Monocot	25	Threatened
Grass, San Joaquin Valley Orcutt	Monocot	38	Threatened
Grass, Slender Orcutt	Dicot	26	Threatened
Gumplant, Ash Meadows	Dicot	4	Threatened
Haha (Cyanea recta)	Dicot	2	Threatened
Ha'lwale (Cyrtandra limahuliensis)	Dicot	2	Threatened
Heartleaf, Dwarf-flowered	Dicot	7	Threatened
Heather, Mountain Golden	Dicot	1	Threatened
Howellia, Water	Dicot	7	Threatened
Iris, Dwarf Lake	Monocot	1	Threatened
Isopod, Madison Cave	Crustacean	1	Threatened
Ivesia, Ash Meadows	Dicot	4	Threatened
Joint-vetch, Sensitive	Dicot	11	Threatened
Kolea (Myrsine linearifolia)	Dicot	2	Threatened
Ladies'-tresses, Ute	Monocot	8	Threatened
Lizard, Coachella Valley Fringe-toed	Reptile	4	Threatened
Lizard, Island Night	Reptile	16	Threatened
Lupine, Kincaid's	Dicot	14	Threatened
Makou (Peucedanum sandwicense)	Dicot	5	Threatened
Manzanita, Ione	Dicot	5	Threatened
Manzanita, Morro	Dicot	5	Threatened
Manzanita, Pallid	Dicot	7	Threatened
Milk-vetch, Ash Meadows	Dicot	3	Threatened
Milk-vetch, Deseret	Dicot	1	Threatened
Milk-vetch, Fish Slough	Dicot	1	Threatened
Milk-vetch, Pierson's	Dicot	2	Threatened

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Milkweed, Mead's	Dicot	42	Threatened
Milkweed, Welsh's	Dicot	1	Threatened
Monkshood, Northern Wild	Dicot	4	Threatened
Moth, Kern Primrose Sphinx	Insect	5	Threatened
Mouse, Preble's Meadow Jumping	Mammal	2	Threatened
Mucket, Orangenacre	Bivalve	13	Threatened
Murrelet, Marbled	Bird	74	Threatened
Mussel, Alabama Moccasinshell	Bivalve	13	Threatened
Mussel, Fine-lined Pocketbook	Bivalve	22	Threatened
Mussel, Heelsplitter Inflated	Bivalve	16	Threatened
Naucorid, Ash Meadows	Insect	3	Threatened
Navarretia, Spreading	Dicot	13	Threatened
Oak, Hinckley	Dicot	2	Threatened
Orchid, Eastern Prairie Fringed	Monocot	24	Threatened
Orchid, Western Prairie Fringed	Monocot	52	Threatened
Owl, Mexican Spotted	Bird	59	Threatened
Owl, Northern Spotted	Bird	96	Threatened
Paintbrush, Ash-grey Indian	Dicot	4	Threatened
Paintbrush, Golden	Dicot	4	Threatened
Pearlshell, Louisiana	Bivalve	2	Threatened
Pink, Swamp	Monocot	8	Threatened
Plover, Western Snowy	Bird	62	Threatened
Pogonia, Small Whorled	Monocot	39	Threatened
Potato-bean, Price's	Dicot	9	Threatened
Prairie Dog, Utah	Mammal	5	Threatened
Pussypaws, Mariposa	Dicot	12	Threatened
Rattlesnake, New Mexican Ridge-nosed	Reptile	6	Threatened
Rocksnail, Painted	Gastropod	4	Threatened
Rocksnail, Round	Gastropod	2	Threatened
Rosemary, Cumberland	Dicot	1	Threatened
Roseroot, Leedy's	Dicot	1	Threatened
Rush-rose, Island	Dicot	6	Threatened
Salamander, Flatwoods	Amphibian	28	Threatened
Salamander, Red Hills	Amphibian	5	Threatened
Salamander, San Marcos	Amphibian	6	Threatened
Sandwort, Bear Valley	Dicot	4	Threatened
Schiedea spergulina var. spergulina (ncn)	Dicot	2	Threatened
Scrub-Jay, Florida	Bird	34	Threatened
Sea turtle, loggerhead	Reptile	77	Threatened
Sea turtle, olive ridley	Reptile	12	Threatened
Seagrass, Johnson's	Monocot	3	Threatened
Shagreen, Magazine Mountain	Gastropod	1	Threatened
Shearwater, Newell's Townsend's	Bird	5	Threatened
Shrimp, Squirrel Chimney Cave	Crustacean	2	Threatened
Silene hawaiiensis (ncn)	Dicot	2	Threatened
Silversword, Haleakala ('Ahinahina)	Dicot	4	Threatened
Skink, Blue-tailed Mole	Reptile	3	Threatened
Skink, Sand	Reptile	7	Threatened
Skipper, Pawnee Montane	Insect	1	Threatened
Skullcap, Florida	Dicot	1	Threatened
Skullcap, Large-flowered	Dicot	2	Threatened
Slabshell, Chipola	Bivalve	3	Threatened
Snail, Newcomb's	Gastropod	2	Threatened
Snake, Atlantic Salt Marsh	Reptile	1	Threatened
Snake, Concho Water	Reptile	13	Threatened
Snake, Eastern Indigo	Reptile	166	Threatened
Snake, Giant Garter	Reptile	45	Threatened

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Snake, Northern Copperbelly Water	Reptile	4	Threatened
Sneezeweed, Virginia	Dicot	4	Threatened
Sparrow, San Clemente Sage	Bird	6	Threatened
Spineflower, Monterey	Dicot	3	Threatened
Spiraea, Virginia	Dicot	9	Threatened
Spurge, Garber's	Dicot	2	Threatened
Spurge, Hoover's	Dicot	36	Threatened
Spurge, Telephus	Dicot	2	Threatened
Sunflower, Pecos	Dicot	6	Threatened
Sunray, Ash Meadows	Dicot	3	Threatened
Tarplant, Otay	Dicot	3	Threatened
Tarplant, Santa Cruz	Dicot	7	Threatened
Tetramolopium rockii (ncn)	Dicot	2	Threatened
Thelypody, Howell's Spectacular	Dicot	3	Threatened
Thistle, Pitcher's	Dicot	7	Threatened
Thistle, Sacramento Mountains	Dicot	2	Threatened
Thornmint, San Diego	Dicot	3	Threatened
Tortoise, Desert	Reptile	36	Threatened
Tortoise, Gopher	Reptile	24	Threatened
Towhee, Inyo Brown	Bird	1	Threatened
Townsendia, Last Chance	Dicot	1	Threatened
Turtle, Bog (Northern population)	Reptile	9	Threatened
Turtle, Flattened Musk	Reptile	6	Threatened
Turtle, Ringed Sawback	Reptile	17	Threatened
Turtle, Yellow-blotched Map	Reptile	10	Threatened
Vervain, California	Dicot	1	Threatened
Water-plantain, Kral's	Monocot	3	Threatened
Whipsnake (=Striped Racer), Alameda	Reptile	7	Threatened
Whitlow-wort, Papery	Dicot	6	Threatened
Wild-buckwheat, Gypsum	Dicot	2	Threatened
Wings, Pigeon	Dicot	4	Threatened
Wolf, Gray	Mammal	2	Threatened

No species were selected for exclusion.

Dispersed species included in report.

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Appendix F. Indirect Effects Endangered Species Analysis for Almond, Filbert, Macadamia Nut, Pecan, Pistachio, English Walnut and other Nuts

Species in Counties by State and Taxa

No species were excluded

Minimum of 10 Acre

All Medium Types Reported

Mammal, Marine mml, Bird, Amphibian, Reptile, Fish, Crustacean, Bivalve, Gastropod, Arachnid, Insect, Dicot, Monocot, Ferns, Conf/cycds, Coral, Lichen

almonds, hazelnuts (filberts), macadamia nuts, nuts - other, pecans, pistachios, walnuts, english

AL, AK, AZ, AR, CA, CO, CT, DE, DC, FL, GA, HI, ID, IL, IN, IA, KS, KY, LA, ME, MD, MA, MI, MN, MS, MO, MT, NE, NV, NH, NJ, NM, NY, NC, ND, OH, OK, OR, PA, PR, RI, SC, SD, TN, TX, UT, VT, VA, WA, WV, WI, WY

Alabama

Amphibian

Salamander, Flatwoods
Ambystoma cingulatum

Baldwin
Covington
Houston
Mobile

Salamander, Red Hills
Phaeognathus hubrichti

Butler
Conecuh
Covington
Crenshaw
Monroe

Bird

Plover, Piping
Charadrius melodus

Baldwin
Mobile

Stork, Wood
Mycteria americana

Autauga

Barbour
Choctaw
Clarke
Colbert
Dallas
Escambia
Lowndes
Montgomery
Washington
Wilcox

Bird

Woodpecker, Red-cockaded
Picoides borealis

Baldwin

Bibb
Calhoun
Cleburne
Conecuh
Covington
Dallas

Escambia
Geneva
Lawrence
Macon
Marshall
Perry
Pickens
Russell
Talladega
Tallapoosa
Tuscaloosa
Winston

Bivalve

Combshell, Southern (=Penitent mussel)
Epioblasma penita

Lamar

Combshell, Upland
Epioblasma metastriata

Cherokee
Jefferson
St. Clair

Kidneyshell, Triangular
Ptychobranchus greenii

Bivalve

Cherokee
Cullman
Jefferson

Lawrence
St. Clair
Walker
Winston

Mucket, Orangenacre
Lampsilis perovalis

Bibb
Fayette
Greene
Jefferson
Lamar
Lawrence
Pickens
Shelby
Winston

Mucket, Pink (Pearlymussel)
Lampsilis abrupta

Colbert
Jackson
Lauderdale
Lauderdale
Lawrence
Madison
Marshall
Morgan

Mussel, Acornshell Southern
Epioblasma othcaloogensis

Cherokee
Shelby
St. Clair

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Bivalve

Mussel, Alabama Moccasinshell
Medionidus acutissimus
Cherokee
Greene
Lamar
Lawrence
Pickens
Shelby
Winston

Mussel, Coosa Moccasinshell
Medionidus parvulus
Cherokee

Talladega
Winston
Mussel, Cumberland Combshell
Epioblasma brevidens

Colbert
Mussel, Dark Pigtoe
Pleurobema furvum

Fayette

Lawrence
Tuscaloosa
Winston
Mussel, Fine-lined Pocketbook
Lampsilis altilis

Bibb
Calhoun
Cherokee
Clay
Cleburne
Cullman

Dallas
De Kalb
Elmore
Fayette
Jefferson
Lawrence
Lee
Macon
Shelby
St. Clair
Talladega
Tallapoosa
Tuscaloosa

Bivalve

Walker
Winston
Mussel, Fine-rayed Pigtoe
Fusconaia cuneolus
Jackson
Madison
Marshall
Mussel, Flat Pigtoe (=Marshall's Mussel)
Pleurobema marshalli

Greene
Mussel, Heavy Pigtoe (=Judge Tait's Mussel)
Pleurobema taitianum
Baldwin
Clarke

Dallas
Greene
Monroe

Pickens

Mussel, Heelsplitter Inflated
Potamilus inflatus
Baldwin
Bibb
Choctaw

Clarke
Greene
Marengo
Sumter
Tuscaloosa
Washington

Mussel, Ovate Clubshell
Pleurobema perovatum
Cullman
Fayette
Greene
Lamar
Lee
Macon
Pickens
St. Clair
Sumter
Tuscaloosa
Walker

Bivalve

Mussel, Ring Pink (=Golf Stick
Obovaria retusa
Colbert
Lauderdale
Mussel, Rough Pigtoe
Pleurobema plenum
Colbert
Lauderdale
Lawrence
Madison
Madison
Marshall
Morgan

Mussel, Shiny Pigtoe
Fusconaia cor
Jackson
Madison
Madison
Marshall
Mussel, Shiny-rayed Pocketbook
Lampsilis subangulata
Lampsilis subangulata
Russell

Mussel, Southern Clubshell
Pleurobema decisum
Bibb
Cherokee
Dallas
Dallas
Fayette
Greene
Lamar
Macon
Marion
Perry

Pickens
Tuscaloosa
Mussel, Southern Pigtoe
Pleurobema georgianum
Calhoun
Cherokee
Cleburne
St. Clair
Pearlymussel, Alabama Lamp
Lampsilis virescens
Jackson
Pearlymussel, Cracking
Hemistena lata

Bivalve

Lauderdale

Pearlymussel, Orange-footed

Plethobasus cooperianus

Madison

Marshall

Morgan

Pearlymussel, Pale Lilliput

Toxolasma cylindrellus

Jackson

Pearlymussel, Turgid-blossom

Epioblasma turgidula

Lauderdale

Pearlymussel, White Wartyback

Plethobasus cicatricosus

Colbert

Lauderdale

Stirrupshell

Quadrula stapes

Greene

Pickens

Sumter

Crustacean

Shrimp, Alabama Cave

Palaemonias alabamae

Madison

Dicot

Amphianthus, Little

Amphianthus pusillus

Chambers

Barbara Buttons, Mohr's

Marshallia mohrii

Bibb

Calhoun

Cherokee

Bladderpod, Lyrate

Lesquerella lyrata

Colbert

Franklin

Lawrence

Clover, Leafy Prairie

Dalea foliosa

Franklin

Jefferson

Dicot

Lawrence

Morgan

Harperella

Ptilimnium nodosum

Cherokee

Cullman

De Kalb

Jackson

Lee

Walker

Leather-flower, Alabama

Clematis socialis

Cherokee

St. Clair

Leather-flower, Morefield's

Clematis morefieldii

Madison

Pitcher-plant, Alabama Canebrake

Sarracenia rubra alabamensis

Autauga

Chilton

Elmore

Pitcher-plant, Green

Sarracenia oreophila

Cherokee

De Kalb

Jackson

Marshall

Potato-bean, Price's

Apios priceana

Autauga

Madison

Marshall

Ferns

Fern, Alabama Streak-sorus

Thelypteris pilosa var. alabamensis

Winston

Fern, American hart's-tongue

Asplenium scolopendrium var. americanum

Jackson

Morgan

Quillwort, Louisiana

Isoetes louisianensis

Ferns

Mobile

Washington

Fish

Cavefish, Alabama

Speoplatyrhinus poulsoni

Lauderdale

Chub, Spotfin

Erimonax monachus

Colbert

Lauderdale

Darter, Goldline

Percina aurolineata

Bibb

Shelby

Darter, Slackwater

Etheostoma boschungi

Lauderdale

Madison

Darter, Snail

Percina tanasi

Madison

Marshall

Darter, Vermilion

Etheostoma chermocki

Jefferson

Darter, Watercress

Etheostoma nuchale

Jefferson

Jefferson

Madtom, Yellowfin

Noturus flavipinnis

Lauderdale

Lauderdale

Sculpin, Pygmy

Sculpin, Pygmy

Cottus paulus (=pygmaeus)

Cottus paulus (=pygmaeus)

Calhoun

Shiner, Blue

Cyprinella caerulea

Calhoun

Cherokee

De Kalb

Shiner, Cahaba

Notropis cahabae

Bibb

Bibb

Jefferson

Perry

US EPA ARCHIVE DOCUMENT

Fish

Shelby
Shiner, Palezone
trissyllepsis
Notropis albizonatus
Jackson
Sturgeon, Alabama

Scaphirhynchus suttkusi
Baldwin
Clarke
Monroe
Wilcox
Sturgeon, Gulf
Acipenser oxyrinchus desotoi
Baldwin
Choctaw
Clarke
Coffee
Conecuh
Covington
Dale
Escambia
Geneva

Mobile
Monroe
Washington
Wilcox

Gastropod

Elimia, Lacy
Elimia crenatella
Talladega
Pebblesnail, Flat
Lepyrium showalteri
Bibb
Shelby
Riversnail, Anthony's

Athearnia anthonyi
Jackson
Rocksnail, Painted
Leptoxis taeniata
Calhoun
Chilton
Shelby
Talladega
Rocksnail, Plicate
Leptoxis plicata

Gastropod

Jefferson
Rocksnail, Round

Leptoxis ampla
Bibb
Shelby

Snail, Lioplax Cylindrical
Lioplax cyclostomaformis
Bibb
Shelby
Snail, Tulotoma
Tulotoma magnifica
Calhoun
Elmore
Shelby
St. Clair
Talladega

Mammal

Bat, Gray
Myotis grisescens
Calhoun
Colbert

Conecuh
De Kalb
Jackson
Lauderdale

Lawrence
Madison
Marshall
Morgan
Shelby
Bat, Indiana
Myotis sodalis
Autauga
Colbert

De Kalb
Jackson
Lawrence
Marshall
Morgan
Shelby
Mouse, Alabama Beach
Peromyscus polionotus ammobates
Baldwin

Mammal

Mouse, Perdido Key Beach
Peromyscus polionotus

Baldwin

Monocot

Grass, Tennessee Yellow-eyed
Xyris tennesseensis
Bibb
Calhoun
Franklin
Trillium, Relict
Trillium reliquum
Bullock
Henry
Lee
Water-plantain, Kral's
Sagittaria secundifolia
De Kalb
Winston

Reptile

Sea turtle, loggerhead
Sea turtle, loggerhead
Caretta caretta
Baldwin
Mobile
Snake, Eastern Indigo
Snake, Eastern Indigo
Drymarchon corais couperi
Baldwin
Bullock
Conecuh
Covington
Escambia
Geneva
Mobile
Washington

Tortoise, Gopher
Gopherus polyphemus
Choctaw
Mobile
Sumter
Washington
Turtle, Alabama Red-bellied
Pseudemys alabamensis
Baldwin
Mobile

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Reptile

Turtle, Flattened Musk
Sternotherus depressus
Cullman
Jefferson
Marshall
Tuscaloosa
Walker
Winston

Arizona

Amphibian

Frog, Chiricahua Leopard
Rana chiricahuensis
Cochise
Gila
Graham
Greenlee
Pima
Yavapai
Salamander, Sonora Tiger
Ambystoma tigrinum stebbinsi
Cochise

Bird

recurva
Bobwhite, Masked
Colinus virginianus ridgwayi
Pima
Condor, California
Gymnogyps californianus
Mohave
Falcon, Northern Aplomado
Falco femoralis septentrionalis
Cochise
Flycatcher, Southwestern Willow
Empidonax traillii extimus
Cochise
Gila
Graham
Greenlee
Maricopa
Mohave
Pima
Pinal
Yavapai
Yuma

Bird

Owl, Mexican Spotted
Strix occidentalis lucida
Cochise
Gila
Graham
Greenlee
Maricopa
Mohave
Pima
Pinal
Yavapai
Pygmy-owl, Cactus Ferruginous
Glaucidium brasilianum cactorum
Cochise
Gila
Graham
Greenlee
Maricopa
Pima
Pinal
Yuma
Rail, Yuma Clapper
Rallus longirostris yumanensis
Gila
Maricopa
Mohave
Pinal
Yuma

Dicot

Blue-star, Kearney's
Amsonia kearneyana
Pima
Cactus, Arizona Hedgehog
Echinocereus triglochidiatus var. arizonicus
Gila
Maricopa
Pinal
Cactus, Cochise Pincushion
Coryphantha robbinsorum
Cochise
Cactus, Nichol's Turk's Head
Echinocactus horizonthalonius var. nicholii

Dicot

Pima
Pinal
Cactus, Pima Pineapple
Coryphantha scheeri var.
Pima
Cactus, Siler Pincushion
Pediocactus (=Echinocactus,=Utahia) sileri
Mohave
Cliffrose, Arizona
Purshia (=cowania) subintegra
Graham
Maricopa
Mohave
Yavapai
Cycladenia, Jones
Cycladenia jonesii (=humilis)
Mohave
Milk-vetch, Holmgren
Astragalus holmgreniorum
Mohave
Umbel, Huachuca Water
Lilaeopsis schaffneriana var.
Cochise
Pima

Fish

Catfish, Yaqui
Ictalurus pricei
Cochise
Chub, Bonytail
Gila elegans
Mohave
Chub, Gila
Gila intermedia
Cochise
Gila
Graham
Greenlee
Pima
Pinal
Yavapai
Chub, Humpback
Gila cypha
Mohave

US EPA ARCHIVE DOCUMENT

Fish

Chub, Virgin River
Gila seminuda (=robusta)
Mohave
Chub, Yaqui
Gila purpurea
Cochise
Minnow, Loach
Tiaroga cobitis
Cochise
Gila
Graham
Greenlee
Pima
Pinal
Yavapai
Pupfish, Desert
Cyprinodon macularius
Cochise
Graham
sonoriensis
Maricopa
Pima
Pinal
Yavapai
Shiner, Beautiful
Cyprinella formosa
Cochise
Spikedace
Meda fulgida
Cochise
Gila
Graham
Greenlee
Pima
Pinal
Yavapai
Squawfish, Colorado
Ptychocheilus lucius
Gila
Yavapai
Sucker, Razorback
Xyrauchen texanus
Gila
Graham
Greenlee

Fish

Maricopa
Mohave
Pinal
Yavapai
Yuma
Topminnow, Gila (Yaqui)
Poeciliopsis occidentalis
Cochise
Gila
Graham
Maricopa
Pima
Pinal
Yavapai
Trout, Apache
Oncorhynchus apache
Gila
Graham
Greenlee
Trout, Gila
Oncorhynchus gilae
Gila
Greenlee
Yavapai
Woundfin
Plagopterus argentissimus
Mohave

Gastropod

Ambersnail, Kanab
Oxyloma haydeni kanabensis
Mohave

Mammal

Bat, Lesser (=Sanborn's) Long-
Leptonycteris curasoae
Cochise
Gila
Graham
Greenlee
Maricopa
Pima
Pinal
Yavapai
Yuma

Mammal

Jaguar
Panthera onca
Cochise
Graham
Greenlee
Pima
Pinal
Jaguarundi, Sinaloan
Herpailurus (=Felis) yagouaroundi tolteca
Cochise
Graham
Ocelot
Leopardus (=Felis) pardalis
Cochise
Graham
Pima
Pronghorn, Sonoran
Antilocapra americana
Maricopa
Pima
Yuma
Squirrel, Mount Graham Red
Tamiasciurus hudsonicus
Graham
Vole, Hualapai Mexican
Microtus mexicanus hualpaiensis
Mohave
Wolf, Gray
Canis lupus
Cochise
Pima

Monocot

Ladies'-tresses, Canelo Hills
Spiranthes delitescens
Cochise

Reptile

Reptile

Rattlesnake, New Mexican Ridge-
Crotalus willardi obscurus
Cochise
Tortoise, Desert
Tortoise, Desert
Gopherus agassizii
Mohave

US EPA ARCHIVE DOCUMENT

Arkansas

Bird

Tern, Interior (population) Least
Sterna antillarum

Arkansas
Chicot
Conway
Crawford
Crittenden
Desha
Faulkner

Franklin
Jefferson
Johnson
Lee
Lincoln
Logan
Lonoke
Mississippi
Perry
Phillips
Pope

Pulaski
Sebastian

St. Francis
Yell

Woodpecker, Red-cockaded
Picoides borealis

Ashley

Jefferson

Lafayette

Perry

Pulaski

Saline

Yell

Bivalve

Fatmucket, Arkansas
Lampsilis powelli
Montgomery
Saline

Mucket, Pink (Pearlymussel)

Lampsilis abrupta

Bivalve

Desha
Hot Spring
Independence

Jackson
Lawrence
Ouachita
Prairie
Sevier
White
Woodruff

Mussel, Scaleshell
Leptodea leptodon
Cross
Howard
Lawrence
Lee
Perry
Saline
Sevier
Sharp
St. Francis

Mussel, Speckled Pocketbook
Lampsilis streckeri

Stone

Pearlymussel, Fat Pocketbook
Potamilus capax
Arkansas

Craighead

Cross

Desha

Lee

Mississippi

Phillips

Poinsett

Prairie
St. Francis

White
Woodruff
Rock-pocketbook, Ouachita
(=Wheeler's pm)

Arkansia wheeleri

Little River

Crustacean

Crayfish, Cave (Cambarus
Cambarus aculabrum
Benton

Crayfish, Cave (Cambarus
zophonastes)
Cambarus zophonastes
Stone

Dicot

Bladderpod, Missouri
Lesquerella filiformis
Izard
Izard
Washington
Fruit, Earth (=geocarpon)
Geocarpon minimum
Franklin
Harperella
Ptilimnium nodosum
Montgomery
Yell
Pondberry
Lindera melissifolia
Clay
Clay
Jackson
Lawrence
Lawrence
Woodruff
Woodruff

Fish

Cavefish, Ozark
Cavefish, Ozark
Amblyopsis rosae

Benton
Benton
Darter, Leopard
Darter, Leopard
Percina pantherina
Percina pantherina
Howard
Howard
Sevier
Sevier
Sturgeon, Pallid
Sturgeon, Pallid
Scaphirhynchus albus
Scaphirhynchus albus
Chicot
Crittenden
Desha
Lee

Mississippi

Phillips

US EPA ARCHIVE DOCUMENT

Arkansas

Clay

Sevier

Crustacean

St. Francis

Gastropod

US EPA ARCHIVE DOCUMENT

Gastropod

Shagreen, Magazine Mountain
Mesodon magazinensis
Logan

Insect

Beetle, American Burying
Nicrophorus americanus
Franklin

toed
Logan
Sebastian

Mammal

Bat, Gray

Myotis grisescens

Baxter

Benton

Boone

Carroll

Independence

Izard

Lawrence
Madison

Marion

Newton

Pope

Sharp
Stone

Washington

Bat, Indiana

Myotis sodalis

Izard

Newton

Stone

Bat, Ozark Big-eared

Corynorhinus (=Plecotus)
townsendii ingens
Marion

Amphibian

Contra Costa
El Dorado
Kern
Los Angeles
Marin

Merced
Monterey

Napa
Nevada
San Benito
San Luis Obispo

San Mateo

Santa Barbara

Santa Clara

Santa Cruz

Shasta

Solano

Ventura

Yuba

Frog, Mountain Yellow-legged
Gopherus agassizii

Los Angeles

Riverside

San Bernardino

Salamander, California Tiger
Ambystoma californiense

Alameda

Contra Costa

Fresno

Kern

Kings

Madera

Merced

Monterey
Sacramento

Amphibian

Stanislaus
Tulare
Yolo

Salamander, Desert Slender
Batrachoseps aridus

Riverside

Salamander, Santa Cruz Long-

Ambystoma macrodactylum
Monterey
Santa Cruz

Toad, Arroyo Southwestern

Bufo californicus (=microscaphus)

Imperial
Imperial
Los Angeles
Los Angeles
Monterey
Monterey
Riverside
Riverside
San Bernardino
San Bernardino
San Diego
San Diego
Santa Barbara
Santa Barbara
Ventura

Bird

Bird

Condor, California
Condor, California
Gymnogyps californianus
Gymnogyps californianus
Kern
Kern
Los Angeles
Monterey
Monterey
San Luis Obispo
San Luis Obispo
Santa Barbara
Santa Barbara
Tulare
Tulare
Ventura
Ventura

Flycatcher, Southwestern Willow
Flycatcher, Southwestern Willow
Empidonax traillii extimus

Kern
Kern
Los Angeles
Riverside

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Washington

California

Amphibian

Frog, California Red-legged
Rana aurora draytonii
Alameda
Butte
Calaveras
San Bernardino
San Joaquin
San Luis Obispo
San Mateo

Santa Barbara
Santa Clara
Santa Cruz
Solano
Sonoma
San Bernardino
San Diego
Santa Barbara

Gnatcatcher, Coastal California
Polioptila californica californica
Los Angeles
Riverside
San Bernardino
San Diego

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Bird

Ventura

Murrelet, Marbled
Brachyramphus marmoratus marmoratus

Glenn
Humboldt
Lake

Loggerhead

Los Angeles
Marin
Mendocino
Monterey

San Diego
San Luis Obispo
San Mateo
Santa Barbara
Santa Cruz
Siskiyou
Sonoma

Owl, Northern Spotted
Strix occidentalis caurina

Colusa
Glenn
Humboldt
Lake
Marin
Mendocino
Napa
Shasta

Siskiyou
Sonoma
Tehama
Trinity

Pelican, Brown
Pelecanus occidentalis

Alameda
Contra Costa
Humboldt
Imperial
Los Angeles
Marin

Mendocino
Monterey

Napa
Riverside

Bird

San Diego
San Luis Obispo
San Mateo

Santa Barbara
Santa Clara
Santa Cruz
Solano

Sonoma
Ventura
Yuba

Plover, Western Snowy
Charadrius alexandrinus nivosus

Alameda
Humboldt
Los Angeles
Marin
Mendocino
Monterey
Napa
San Diego
San Luis Obispo
San Mateo
Santa Barbara
Santa Clara
Santa Cruz
Sonoma
Ventura

Rail, California Clapper
Rallus longirostris obsoletus

Alameda
Contra Costa
Marin
Monterey
Napa
San Luis Obispo
San Mateo
Santa Clara
Solano
Sonoma

Rail, Light-footed Clapper
Rallus longirostris levipes

Los Angeles

San Diego
Santa Barbara

Bird

Ventura

Rail, Yuma Clapper
Rallus longirostris yumanensis

Imperial
Riverside
San Bernardino

Shrike, San Clemente

Lanius ludovicianus mearnsi

Los Angeles

Sparrow, San Clemente Sage
Amphispiza belli clementeae
Amphispiza belli clementeae

Los Angeles

Tern, California Least
Sterna antillarum browni

Alameda
Contra Costa
Los Angeles
Monterey
San Diego
San Luis Obispo
San Mateo
Santa Barbara
Santa Clara
Ventura

Towhee, Inyo Brown
Pipilo crissalis eremophilus

Inyo

Vireo, Least Bell's
Vireo bellii pusillus

Inyo
Kern
Los Angeles
Monterey
Riverside
San Bernardino
San Diego
San Luis Obispo
Santa Barbara
Ventura

Conf/cycds

Cypress, Gowen
Cupressus goveniana ssp.

Monterey
Monterey

US EPA ARCHIVE DOCUMENT

Conf/cycds

Cypress, Santa Cruz
Cupressus abramsiana
San Mateo
Santa Cruz

Crustacean

Abalone, White
Haliotis sorenseni
Los Angeles
San Diego
Santa Barbara
Ventura

Crayfish, Shasta
Pacifastacus fortis
Shasta

Fairy Shrimp, Conservancy Fairy
Branchinecta conservatio

Butte
Glenn
Merced
Solano
Tehama
Ventura

Fairy Shrimp, Longhorn
Branchinecta longiantenna
Alameda
Contra Costa

Kern
Monterey
San Luis Obispo

Fairy Shrimp, Riverside
Streptocephalus woottoni
Los Angeles
Riverside

San Diego
Ventura

Fairy Shrimp, San Diego
Branchinecta sandiegonensis
San Diego

Fairy Shrimp, Vernal Pool
Branchinecta lynchi
Alameda
Amador
Butte
Colusa

Crustacean

Contra Costa
Fresno
Glenn
Kings
Madera
Mariposa

Merced
Monterey
Napa
Placer
Riverside
Sacramento

San Benito
San Joaquin
San Luis Obispo

Santa Barbara

Shasta
Solano
Stanislaus
Tehama
Tulare
Ventura
Yuba

Shrimp, California Freshwater
Syncaris pacifica
Marin

Napa
Sonoma

Tadpole Shrimp, Vernal Pool
Lepidurus packardi

Alameda
Amador
Butte

Calaveras
Colusa
El Dorado

Fresno
Glenn
Kings

Madera
Mariposa
Merced
Placer
Sacramento

Crustacean

San Joaquin
Shasta
Solano
Stanislaus
Sutter
Tehama

Tulare
Yolo
Yuba

Dicot

Adobe Sunburst, San Joaquin
Pseudobahia peirsonii
Pseudobahia peirsonii
Fresno
Madera
Stanislaus
Stanislaus

Allocarya, Calistoga
Plagiobothrys strictus
Napa

Ambrosia, San Diego
Ambrosia pumila
Riverside
San Diego

Baccharis, Encinitas
Baccharis vanessae
San Diego

Barberry, Island
Berberis pinnata ssp. insularis
Santa Barbara

Barberry, Nevin's
Berberis nevinii
Berberis nevinii
Los Angeles
Riverside

Bedstraw, El Dorado
Galium californicum ssp. sierrae
El Dorado

Bedstraw, Island
Galium buxifolium
Santa Barbara

Bird's-beak, Palmate-bracted
Cordylanthus palmatus
Alameda
Colusa
Fresno
Madera

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Dicot

San Joaquin
Yolo
Bird's-beak, Pennell's
succulenta
Cordylanthus tenuis ssp. capillaris
Sonoma
Bird's-beak, salt marsh
Cordylanthus maritimus ssp.
Los Angeles
San Diego
San Luis Obispo
Santa Barbara
Ventura
Bird's-beak, Soft
Cordylanthus mollis ssp. mollis
Contra Costa
Napa
Solano
Bladderpod, San Bernardino
Lesquerella kingii ssp. bernardina
San Bernardino
Bluecurls, Hidden Lake
Trichostema austromontanum ssp. compactum

San Bernardino

Broom, San Clemente Island
Lotus dendroideus ssp. traskiae

Los Angeles
Buckwheat, Cushenbury
Eriogonum ovalifolium var. vineum
San Bernardino
Buckwheat, Ione (incl. Irish Hill)
Eriogonum apricum (incl. var. prostratum)
Amador
Buckwheat, Southern Mountain
Eriogonum kennedyi var.
austromontanum
San Bernardino
Bush-mallow, San Clemente Island
Malacothamnus clementinus
Los Angeles
Bush-mallow, Santa Cruz Island
Malacothamnus fasciculatus var. nesioticus

Santa Barbara

Dicot

Butterweed, Layne's
Senecio layneae
El Dorado

Tuolumne
Button-celery, San Diego
Eryngium aristulatum var. parishii
Riverside
San Diego
Cactus, Bakersfield
Opuntia treleasei
Kern
Ceanothus, Coyote
Ceanothus ferrisae
Santa Clara
Ceanothus, Pine Hill
Ceanothus roderickii
El Dorado
Ceanothus, Vail Lake
Ceanothus ophiochilus
Riverside
Centaury, Spring-loving
Centaurium namophilum

Inyo

Checker-mallow, Keck's
Sidalcea keckii

Fresno
Tulare
Checker-mallow, Kenwood Marsh
Sidalcea oregana ssp. valida
Sonoma
Checker-mallow, Pedate
Sidalcea pedata
Sidalcea pedata
San Bernardino
Clarkia, Pismo
Clarkia speciosa ssp. immaculata
San Luis Obispo
Clarkia, Presidio
Clarkia franciscana
Alameda
Clarkia, Springville
Clarkia springvillensis
Tulare

Clarkia, Vine Hill
Clarkia imbricata

Dicot

Sonoma
Clover, Fleshy Owl's
Castilleja campestris ssp.

Fresno
Madera
Mariposa
Merced
San Joaquin
Stanislaus
Tuolumne
Clover, Monterey
Trifolium trichocalyx
Monterey
Clover, Showy Indian
Trifolium amoenum
Marin
Sonoma
Coyote-thistle, Loch Lomond
Eryngium constancei
Lake
Crownbeard, Big-leaved
Verbesina dissita

San Diego

Crownscale, San Jacinto Valley
Atriplex coronata var. notatior
Riverside
Riverside
Daisy, Parish's
Erigeron parishii
Riverside
San Bernardino
Dudleya, Conejo
Dudleya abramsii ssp. parva
Dudleya abramsii ssp. parva
Ventura
Dudleya, Marcescent
Dudleya cymosa ssp. marcescens
Los Angeles
Santa Barbara
Dudleya, Santa Clara Valley
Dudleya setchellii
Alameda
Contra Costa
Fresno

Monterey
San Benito

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US EPA ARCHIVE DOCUMENT

Dicot

Santa Clara
Dudleya, Santa Cruz Island
Dudleya nesiotica
Santa Barbara
Dudleya, Santa Monica Mountains
Dudleya cymosa ssp. ovatifolia
Los Angeles
Ventura
Dudleya, Verity's
Dudleya verityi
Ventura
Dwarf-flax, Marin
Hesperolinon congestum
Marin
Evening-primrose, Antioch Dunes
Oenothera deltoides ssp. howellii
Contra Costa
Sacramento
Evening-primrose, Eureka Valley
Oenothera avita ssp. eurekensis
Inyo
Evening-primrose, San Benito
Camissonia benitensis
San Benito
Fiddleneck, Large-flowered
Amsinckia grandiflora
Alameda
Contra Costa
San Joaquin
Flannelbush, Mexican
Fremontodendron mexicanum
San Diego
Flannelbush, Pine Hill
Fremontodendron californicum ssp. decumbens
El Dorado
Fringepod, Santa Cruz Island
Thysanocarpus conchuliferus
Santa Barbara
Gilia, Hoffmann's Slender-flowered
Gilia tenuiflora ssp. hoffmannii
Santa Barbara
Gilia, Monterey
Gilia tenuiflora ssp. arenaria

Dicot

Monterey
Golden Sunburst, Hartweg's
Pseudobahia bahiifolia
Fresno
Madera
Stanislaus
Goldfields, Burke's
Lasthenia burkei
Lake
Mendocino
Sonoma
Goldfields, Contra Costa
Lasthenia conjugens
Alameda
Contra Costa
Mendocino
Monterey
Napa
Santa Barbara
Santa Clara
Solano
Grass, Hairy Orcutt
Orcuttia pilosa
Butte
Colusa
Fresno
Glenn
Madera
Mariposa
Merced
Stanislaus
Tehama
Grass, Sacramento Orcutt
Orcuttia viscida
Amador
Sacramento
Grass, Slender Orcutt
Orcuttia tenuis
Butte
Lake
Sacramento
Shasta
Siskiyou
Tehama

Dicot

Gumplant, Ash Meadows
Grindelia fraxino-pratensis
Inyo
Ivesia, Ash Meadows
Ivesia kingii var. eremica
Inyo
Jewelflower, California
Caulanthus californicus
Fresno
Kern
Kings
San Luis Obispo
Santa Barbara
Tulare
Jewelflower, Tiburon
Streptanthus niger
Marin
Larkspur, Baker's
Delphinium bakeri
Marin
Sonoma
Larkspur, San Clemente Island
Delphinium variegatum ssp.
Los Angeles
Larkspur, Yellow
Delphinium luteum
Marin
Sonoma
Layia, Beach
Layia carnosa
Humboldt
Marin
Monterey
Santa Barbara
Lessingia, San Francisco
Lessingia germanorum (=L.g. var. germanorum)
San Mateo
Liveforever, Santa Barbara Island
Dudleya traskiae
Santa Barbara
Lupine, Clover
Lupinus tidestromii
Madera

Dicot

Marin
Monterey
Sonoma
Lupine, Nipomo Mesa
Lupinus nipomensis
San Luis Obispo
Malacothrix, Island
Malacothrix squalida
Santa Barbara
Malacothrix, Santa Cruz Island
Malacothrix indecora
Santa Barbara
Ventura
Mallow, Kern
Eremalche kernensis
Kern
Manzanita, Del Mar
Arctostaphylos glandulosa ssp. crassifolia

San Diego
Manzanita, Ione
Arctostaphylos myrtifolia
Amador
Calaveras

Manzanita, Morro

Arctostaphylos morroensis
San Luis Obispo
Manzanita, Pallid
Arctostaphylos pallida
Alameda
Contra Costa
Manzanita, Santa Rosa Island
Arctostaphylos confertiflora
Santa Barbara
Meadowfoam, Butte County
Limnanthes floccosa ssp.
Butte
Tehama
Meadowfoam, Sebastopol
goodmaniana
Limnanthes vinculans
Sonoma
Milk-vetch, Braunton's
Astragalus brauntonii
Los Angeles

Dicot

Ventura
Milk-vetch, Clara Hunt's
Astragalus clarianus
Napa
Sonoma
Milk-vetch, Coachella Valley
Astragalus lentiginosus var.
Riverside
Milk-vetch, Coastal Dunes
Astragalus tener var. titi
Monterey
Milk-vetch, Cushenbury
Astragalus albens
San Bernardino
Milk-vetch, Fish Slough
Astragalus lentiginosus var.
Inyo
Milk-vetch, Lane Mountain

Astragalus jaegerianus
San Bernardino
Milk-vetch, Pierson's
Astragalus magdalenae var.
Imperial

Milk-vetch, Triple-ribbed
Astragalus tricarinatus
Riverside

San Bernardino
Milk-vetch, Ventura Marsh
Astragalus pycnostachyus var. lanosissimus
Santa Barbara
Ventura
Mint, Otay Mesa
Pogogyne nudiuscula
Riverside
San Diego
Mint, San Diego Mesa
Pogogyne abramsii
San Diego

Monardella, Willowy
Monardella linoides ssp. viminea
San Diego
Morning-glory, Stebbins
Calystegia stebbinsii

Dicot

El Dorado
Mountainbalm, Indian Knob
Eriodictyon altissimum
San Luis Obispo
Mountain-mahogany, Catalina
Cercocarpus traskiae
Los Angeles
Mustard, Slender-petaled
Thelypodium stenopetalum
San Bernardino
Navarretia, Few-flowered
Navarretia leucocephala ssp. pauciflora (=N. pauciflora)
Alameda
Contra Costa
Mendocino
Napa
Santa Barbara
Santa Clara
Santa Clara
Solano
Navarretia, Many-flowered
Navarretia leucocephala ssp.
Alameda
Contra Costa

Mendocino
Napa
Napa
Santa Barbara
Santa Clara
Solano
Navarretia, Spreading
Navarretia fossalis
Los Angeles
Riverside
San Diego
Niterwort, Amargosa
Nitrophila mohavensis
Inyo
Oxytheca, Cushenbury
Oxytheca parishii var.

San Bernardino
Paintbrush, Ash-grey Indian
Castilleja cinerea
San Bernardino

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Dicot

Paintbrush, San Clemente Island
Castilleja grisea
Los Angeles

Paintbrush, Soft-leaved
Castilleja mollis
Santa Barbara

Paintbrush, Tiburon
Castilleja affinis ssp. neglecta
Marin
Napa
Santa Clara

Penny-cress, Kneeland Prairie
Thlaspi californicum
Humboldt

Pentachaeta, Lyon's
Pentachaeta lyonii
Los Angeles
Ventura

Pentachaeta, White-rayed
Pentachaeta bellidiflora
Marin
San Mateo
Santa Cruz

Phacelia, Island
Phacelia insularis ssp. insularis
Santa Barbara

Phlox, Yreka
Phlox hirsuta
Siskiyou

Polygonum, Scott's Valley
Polygonum hickmanii
Santa Cruz

Potentilla, Hickman's
Potentilla hickmanii
Monterey
San Mateo

Pussypaws, Mariposa
conjugens
Calyptridium pulchellum
Fresno
Madera
Mariposa

Rock-cress, Hoffmann's
Arabis hoffmannii
Santa Barbara

Dicot

Rock-cress, McDonald's
Arabis mcdonaldiana
Mendocino

Rock-cress, Santa Cruz Island
Sibara filifolia
Los Angeles

Rush-rose, Island
Helianthemum greenei
Los Angeles

Sandwort, Bear Valley
Arenaria ursina
San Bernardino

Sandwort, Marsh
Arenaria paludicola
San Luis Obispo

Sea-blite, California
Suaeda californica
San Luis Obispo

Spineflower, Ben Lomond
Chorizanthe pungens var.
Santa Cruz

Spineflower, Howell's
Chorizanthe howellii
Mendocino

Spineflower, Monterey
Chorizanthe pungens var. pungens
Monterey
Santa Cruz

Spineflower, Orcutt's
Chorizanthe orcuttiana
San Diego

Spineflower, Robust
Chorizanthe robusta var. robusta
Monterey
Santa Cruz

Spineflower, Scotts Valley
Chorizanthe robusta var. hartwegii
Santa Cruz

Spineflower, Slender-horned
Dodecahema leptoceras
Los Angeles
Riverside
San Bernardino
San Diego

Dicot

Spineflower, Sonoma
Chorizanthe valida
Marin
Sonoma

Spurge, Hoover's
Chamaesyce hooveri
Butte
Colusa
Glenn
Merced
Stanislaus
Tehama
Tulare
Tuolumne

Stickyseed, Baker's
Blennosperma bakeri
Sonoma

Stonecrop, Lake County
Parvisedum leiocarpum
Alameda
Contra Costa
Mendocino
Napa
Santa Barbara
Santa Clara
Solano

Sunflower, San Mateo Woolly
Eriophyllum latilobum
San Mateo

Taraxacum, California
Taraxacum californicum
San Bernardino

Tarplant, Gaviota
Deinandra increscens ssp. villosa
Santa Barbara

Tarplant, Otay
Deinandra (=Hemizonia)
San Diego

Tarplant, Santa Cruz
Holocarpha macradenia
Contra Costa
Monterey
Santa Cruz

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Dicot

Thistle, Chorro creek Bog
Cirsium fontinale var. obispoense
San Luis Obispo

Thistle, Fountain
Cirsium fontinale var. fontinale
San Mateo
Santa Barbara
Santa Clara

Thistle, La Graciosa
Cirsium loncholepis
San Luis Obispo
Santa Barbara

Thistle, Suisun
Cirsium hydrophilum var. hydrophilum
Solano

Thornmint, San Diego
Acanthomintha ilicifolia
San Diego

Thornmint, San Mateo
Acanthomintha obovata ssp. duttonii
San Mateo

Tuctoria, Green's
Tuctoria greenei
Butte
Colusa
Glenn
Madera
Mariposa
Merced
Shasta
Stanislaus
Tehama
Tuolumne

Vervain, California
Verbena californica
Tuolumne

Wallflower, Ben Lomond
Erysimum teretifolium
Santa Cruz

Wallflower, Contra Costa
Erysimum capitatum var.
Contra Costa

Wallflower, Menzie's
Erysimum menziesii

Dicot

Humboldt
Mendocino
Monterey

Watercress, Gambel's
Rorippa gambellii
Los Angeles
San Bernardino
San Diego
San Luis Obispo
Ventura

Woodland-star, San Clemente Island
Lithophragma maximum
Los Angeles

Woolly-star, Santa Ana River
Eriastrum densifolium ssp. sanctorum
Riverside
San Bernardino

Woolly-threads, San Joaquin
Monolopia (=Lembertia) congdonii
Fresno
Kern
Kings
San Benito
San Luis Obispo
Santa Barbara
Tulare

Yerba Santa, Lompoc
Eriodictyon capitatum
Santa Barbara

Fish

Chub, Bonytail
Gila elegans
Imperial
Riverside
San Bernardino

Chub, Mohave Tui
Gila bicolor mohavensis
Kern
Los Angeles
San Bernardino
San Diego

Chub, Owens Tui
Gila bicolor snyderi
Inyo

Fish

Dace, Ash Meadows Speckled
Rhinichthys osculus nevadensis
Inyo

Goby, Tidewater
Eucyclogobius newberryi
Alameda
Contra Costa
Humboldt
Los Angeles
Marin
Mendocino
Monterey
San Diego
San Luis Obispo
San Mateo
Santa Barbara
Santa Clara
Santa Cruz
Sonoma
Ventura

Pupfish, Desert
Cyprinodon macularius
Imperial
Riverside
San Bernardino
San Diego

Pupfish, Owens
Cyprinodon radiosus
Inyo

Salmon, Chinook (California Coastal Run)
Oncorhynchus (=Salmo)
Humboldt
Mendocino
Sonoma

Salmon, Chinook (Central Valley Fall Run)
Oncorhynchus (=Salmo)
Sacramento
San Joaquin

Salmon, Chinook (Central Valley Spring Run)
Oncorhynchus (=Salmo)
Alameda
Butte

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Colusa
Contra Costa
Glenn

Marin
Napa
Nevada
Placer
Sacramento
San Mateo
Santa Clara
Shasta
Solano
Sonoma
Sutter
Tehama

Yolo
Yuba

Salmon, Chinook (Sacramento River Winter Run)
Oncorhynchus (=Salmo)
Alameda
Butte
Colusa
Contra Costa
Glenn
Marin
Napa
Sacramento
San Mateo
Shasta
Solano
Sonoma

Sutter
Tehama
Yolo

Salmon, Coho (Central California Coast population)
Oncorhynchus (=Salmo) kisutch
Marin
Mendocino
Threespine

williamsoni
Napa
San Mateo
Santa Cruz
Sonoma

Salmon, Coho (Southern OR/Northern CA Coast)
Oncorhynchus (=Salmo) kisutch

Glenn
Humboldt
Lake
Mendocino
Siskiyou
Trinity
Smelt, Delta
Hypomesus transpacificus
Sacramento
San Joaquin
Solano
Yolo

Squawfish, Colorado
Ptychocheilus lucius
Imperial

Riverside
San Bernardino
Steelhead, (California Central Valley population)
Oncorhynchus (=Salmo) mykiss
Alameda
Amador
Butte
Calaveras
Colusa
Contra Costa
El Dorado
Glenn
Marin

Merced
Nevada
Placer
Sacramento

San Joaquin
San Mateo
Shasta
Solano

Sonoma
Stanislaus
Sutter
Tehama
Tuolumne

Yolo
Yuba

Steelhead, (Central California Coast population)
Oncorhynchus (=Salmo) mykiss
Alameda
Contra Costa
Marin
Mendocino
Napa
San Mateo
Santa Cruz
Solano
Sonoma
Steelhead, (Northern California population)
Oncorhynchus (=Salmo) mykiss
Oncorhynchus (=Salmo) mykiss
Glenn
Humboldt

Lake
Mendocino
Sonoma
Trinity
Steelhead, (South-Central California population)
Oncorhynchus (=Salmo) mykiss
Monterey
San Benito
San Luis Obispo
Santa Clara
Santa Cruz
Steelhead, (Southern California population)
Oncorhynchus (=Salmo) mykiss
Los Angeles
San Diego
San Luis Obispo
San Luis Obispo
Santa Barbara
Ventura

Stickleback, Unarmored

Gasterosteus aculeatus

Los Angeles
San Bernardino
San Diego
Santa Barbara

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Fish

Sturgeon, green
Acipenser medirostris
Sacramento
Solano
Sutter
Yolo

Sucker, Lost River
Deltistes luxatus
Siskiyou

Sucker, Razorback
Xyrauchen texanus
Imperial
Riverside
San Bernardino

Sucker, Santa Ana
Catostomus santaanae
Los Angeles
Riverside
San Bernardino

Trout, Lahontan Cutthroat
Oncorhynchus clarki henshawi
El Dorado
Inyo
Madera
Nevada
Placer
Tuolumne

Trout, Little Kern Golden
Oncorhynchus aguabonita whitei
Fresno
Tulare

Trout, Paiute Cutthroat
Oncorhynchus clarki seleniris
Fresno
Madera

Gastropod

Snail, Morro Shoulderband
Helminthoglypta walkeriana
San Luis Obispo

Insect

Beetle, Delta Green Ground
Elaphrus viridis
Solano

Insect

Beetle, Mount Hermon June
Polyphylla barbata
Santa Cruz

Beetle, Ohlone Tiger
Cicindela ohlone
Santa Cruz

Beetle, Valley Elderberry Longhorn
Desmocerus californicus dimorphus
Butte
Colusa
El Dorado
Fresno
Glenn
Madera
Mariposa
Merced
Placer
Sacramento
San Joaquin
Solano
Stanislaus
Sutter
Tehama
Yolo
Yuba

Butterfly, Bay Checkerspot
(Wright's euphydryas)
Euphydryas editha bayensis
Alameda
Contra Costa
San Mateo
Santa Clara

Butterfly, Behren's Silverspot
Speyeria zerene behrensii
Mendocino
Sonoma

Butterfly, Callippe Silverspot
Speyeria callippe callippe
Alameda
San Mateo

Butterfly, El Segundo Blue
Euphilotes battoides allyni
Los Angeles

Insect

Butterfly, Lange's Metalmark
Apodemia mormo langei
Contra Costa

Butterfly, Lotis Blue
Lycaeides argyrognomon lotis
Mendocino

Butterfly, Mission Blue
Icaricia icarioides missionensis
Marin
San Mateo

Butterfly, Myrtle's Silverspot
Speyeria zerene myrtleae
Marin
Sonoma

Butterfly, Palos Verdes Blue
Glaucopsyche lygdamus palosverdesensis
Los Angeles

Butterfly, Quino Checkerspot
Euphydryas editha quino (=E. e. wrighti)
Riverside
San Diego

Butterfly, San Bruno Elfin
Callophrys mossii bayensis
San Mateo

Butterfly, Smith's Blue
Euphilotes enoptes smithi
Monterey
Monterey

Fly, Delhi Sands Flower-loving
Rhaphiomidas terminatus
Riverside
San Benito
San Benito
San Bernardino

Grasshopper, Zayante Band-
Trimerotropis infantilis
Santa Cruz

Moth, Kern Primrose Sphinx
Euproserpinus euterpe
Euproserpinus euterpe
Kern
Kern

Skipper, Laguna Mountain
Skipper, Laguna Mountain
Pyrgus ruralis lagunae
San Diego

Mammal

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Mammal

Fox, San Joaquin Kit
Vulpes macrotis mutica
Alameda
Contra Costa
Fresno
Kern
Kings
Madera
Merced
Monterey
Napa

San Benito
San Joaquin
San Luis Obispo
Santa Barbara

Santa Clara
Stanislaus
Tulare

Fox, San Miguel Island
Urocyon littoralis littoralis

Santa Barbara

Fox, Santa Catalina Island

Urocyon littoralis catalinae

Los Angeles

Fox, Santa Cruz Island
Urocyon littoralis santacruzae

Santa Barbara

Fox, Santa Rosa Island
Urocyon littoralis santarosae
Santa Barbara

Kangaroo Rat, Fresno
Dipodomys nitratoides exilis

Fresno
Kings
Madera
Merced

Kangaroo Rat, Giant
Dipodomys ingens

Fresno
Kern
Kings

Merced
Monterey
San Benito

Mammal

San Luis Obispo
Santa Barbara
Tulare
Kangaroo Rat, Morro Bay
Dipodomys heermanni morroensis
San Luis Obispo
Kangaroo Rat, San Bernardino
Merriam's
Dipodomys merriami parvus
Riverside
San Bernardino

Kangaroo Rat, Stephens'
Dipodomys stephensi (incl. D.
Riverside
San Bernardino

San Diego
Kangaroo Rat, Tipton
Dipodomys nitratoides nitratoides
Kern

Kings

Tulare

Mountain Beaver, Point Arena

Aplodontia rufa nigra

Mendocino

Mouse, Pacific Pocket
Perognathus longimembris

Los Angeles
San Diego

Mouse, Salt Marsh Harvest
Reithrodontomys raviventris
Alameda

Contra Costa

Marin
Napa
San Mateo

Santa Clara
Solano

Sonoma

Rabbit, Riparian Brush
Sylvilagus bachmani riparius
San Joaquin

Sheep, Peninsular Bighorn
Ovis canadensis
Imperial

Mammal

Inyo
Riverside
San Diego
Sheep, Sierra Nevada Bighorn
Ovis canadensis californiana
Inyo
San Diego
Shrew, Buena Vista Lake Ornate
Sorex ornatus relictus
Kern

Vole, Amargosa
Microtus californicus scirpensis
Inyo
San Bernardino

Woodrat, Riparian
Neotoma fuscipes riparia
San Joaquin

Marine mml

Otter, Southern Sea
Otter, Southern Sea
Enhydra lutris nereis

Monterey

San Luis Obispo

Santa Cruz

Seal, Guadalupe Fur
Arctocephalus townsendi

Santa Barbara

Monocot

Alopecurus, Sonoma
Alopecurus aequalis var.
Marin
Sonoma
Sonoma

Amole, Cammatta Canyon
Chlorogalum purpureum var.
San Luis Obispo

Amole, Purple
Chlorogalum purpureum var. purpureum

Monterey
San Luis Obispo

Bluegrass, Napa
Poa napensis
Napa

Bluegrass, San Bernardino

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Monocot

San Bernardino
San Diego
Brodiaea, Chinese Camp
Brodiaea pallida
Tuolumne
Brodiaea, Thread-leaved
Brodiaea filifolia
Los Angeles
Riverside
San Bernardino
San Diego
Grass, California Orcutt
Orcuttia californica
Riverside
San Diego
Ventura
Grass, Colusa
Neostapfia colusana
Calaveras
Mariposa
Merced
Solano
Stanislaus
Tuolumne
Yolo
Grass, Eureka Dune
Swallenia alexandrae
Inyo
Grass, San Joaquin Valley Orcutt
Orcuttia inaequalis
Butte
Fresno
Jumping
Madera
Mariposa
Merced
Sacramento
Solano
Tulare
Grass, Solano
Tuctoria mucronata
Solano
Yolo
Lily, Pitkin Marsh
Lilium pardalinum ssp. pitkinense

Monocot

Sonoma
Lily, Western
Lilium occidentale
Humboldt
Onion, Munz's
Allium munzii
Riverside
Piperia, Yadon's
Piperia yadonii
Monterey
Sedge, White
Carex albida
Sonoma

Reptile

Lizard, Blunt-nosed Leopard
Gambelia silus
Fresno
Kern
Kings
Los Angeles
Madera
Merced
San Benito
San Luis Obispo
Santa Barbara
Tulare
Ventura
Lizard, Coachella Valley Fringe-
Uma inornata
Riverside
Lizard, Island Night
Xantusia riversiana
Los Angeles
Santa Barbara
Ventura
Sea turtle, olive ridley
Lepidochelys olivacea
Humboldt
Mendocino
Monterey
San Diego
Snake, Giant Garter
Thamnophis gigas
Butte

Reptile

Colusa
Fresno
Glenn
Merced
Sacramento
San Joaquin
Sutter
Yolo
Snake, San Francisco Garter
Thamnophis sirtalis tetrataenia
San Mateo
Santa Cruz
Tortoise, Desert
Gopherus agassizii
Imperial
Inyo
Kern
Los Angeles
Riverside
San Bernardino
Whipsnake (=Striped Racer),
Masticophis lateralis euryxanthus
Alameda
Contra Costa

Colorado

Insect

Insect

Skipper, Pawnee Montane
Hesperia leonardus montana
Jefferson

Mammal

Mouse, Preble's Meadow
Zapus hudsonius preblei
Elbert
Jefferson

Monocot

Ladies'-tresses, Ute
Spiranthes diluvialis
Jefferson

Connecticut

Bird

Plover, Piping
Charadrius melodus

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Bird

New London

Bivalve

Mussel, Dwarf Wedge
Alasmidonta heterodon

Hartford

Dicot

Gerardia, Sandplain
Agalinis acuta

Windham

Fish

Sturgeon, Shortnose
Acipenser brevirostrum

Hartford

Mammal

Bat, Indiana
Myotis sodalis

Windham

Florida

Amphibian

Salamander, Flatwoods
Ambystoma cingulatum

Baker
Bradford
Calhoun
Holmes
Jackson
Jefferson
Liberty
Okaloosa
Santa Rosa
Wakulla
Walton
Washington

Bird

Caracara, Audubon's Crested
Polyborus plancus audubonii

Charlotte
Hardee
Hendry
Highlands
Manatee
Martin

Bird

Orange
Osceola
Palm Beach
Polk

Kite, Everglade Snail
Rostrhamus sociabilis plumbeus

Broward
Citrus
Dade
Hendry
Highlands
Lake
Lee
Marion
Martin
Orange
Osceola
Palm Beach
Polk
Sumter
Volusia

Plover, Piping
Charadrius melodus

Bay
Dade
Duval
Escambia
Hillsborough
Lee
Manatee
Martin
Nassau
Okaloosa
Palm Beach
Pasco
Pinellas
Santa Rosa
Volusia
Wakulla
Walton

Scrub-Jay, Florida
Aphelocoma coerulescens

Alachua
Charlotte

Bird

Citrus
Clay
Dixie
Gilchrist
Hardee
Hendry
Highlands
Hillsborough
Lake
Lee
Levy
Levy
Manatee
Marion
Marion
Martin
Orange
Osceola
Palm Beach
Pasco
Pinellas
Polk
Putnam
Seminole
Sumter
Volusia

Sparrow, Cape Sable Seaside
Ammodramus maritimus mirabilis

Dade

Sparrow, Florida Grasshopper
Ammodramus savannarum

Dade
Highlands
Osceola
Polk

Stork, Wood
Mycteria americana

Alachua
Baker
Bay
Bradford
Broward
Calhoun
Charlotte
Citrus
Clay

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US EPA ARCHIVE DOCUMENT

Bird

Columbia
Dade
Dixie
Duval
Escambia
Gadsden
Gilchrist
Hamilton
Hardee
Hendry
Highlands
Hillsborough
Holmes
Jackson
Jefferson
Lafayette
Lake
Lee
Leon
Levy
Liberty
Madison
Manatee
Marion
Martin
Nassau
Okaloosa
Orange
Osceola
Palm Beach
Pasco
Pinellas
Polk
Putnam
Santa Rosa
Seminole
Sumter
Suwannee
Union
Volusia

Wakulla
Walton
Washington

Bird

Woodpecker, Red-cockaded
Picoides borealis
Alachua
Baker
Bay
Bradford
Broward
Charlotte
Citrus
Clay
Columbia
Dade
Dixie
Duval
Escambia
Gilchrist
Hamilton
Hardee
Hendry
Highlands
Hillsborough
Holmes
Jackson
Lafayette
Lake
Lee
Leon
Levy
Liberty
Madison
Manatee
Marion
Martin
Nassau
Okaloosa
Orange
Osceola
Palm Beach
Pasco
Pinellas

Polk
Putnam
Santa Rosa
Seminole

Bird

Sumter
Suwannee
Union
Volusia
Wakulla
Walton
Washington

Bivalve

Bankclimber, Purple
Elliptoideus sloatianus
Calhoun
Gadsden
Jackson
Leon
Liberty
Wakulla

Mussel, Gulf Moccasinshell
Medionidus penicillatus
Calhoun
Gadsden
Jackson

Mussel, Ochlockonee
Medionidus simpsonianus
Gadsden
Leon
Liberty
Wakulla

Mussel, Oval Pigtoe
Pleurobema pyriforme
Alachua
Bay
Bradford
Calhoun
Columbia
Gadsden
Jackson
Leon
Union
Washington

Mussel, Shiny-rayed Pocketbook
Lampsilis subangulata
Calhoun
Gadsden
Jackson

US EPA ARCHIVE DOCUMENT

Bivalve

Leon

Slabshell, Chipola
Elliptio chipolaensis

Calhoun
Jackson

Threeridge, Fat (Mussel)
Amblema neislerii

Calhoun
Gadsden

Conf/cycds

Torreya, Florida
Torreya taxifolia

Gadsden

Jackson
Liberty

Crustacean

Shrimp, Squirrel Chimney Cave
Palaemonetes cummingi

Alachua

Dicot

cornutissima
Aster, Florida Golden

Chrysopsis floridana

Hardee

Hillsborough
Pinellas

Birds-in-a-nest, White
Macbridea alba

Bay

Liberty

Blazing Star, Scrub
Liatris ohlingerae

Highlands
Polk

Bonamia, Florida
Bonamia grandiflora

Charlotte
Hardee

Highlands
Lake
Lee
Marion
Orange
Osceola

Dicot

Polk

Buckwheat, Scrub
Eriogonum longifolium var. gnaphalifolium

Highlands
Lake

Marion

Orange
Osceola
Polk

Butterwort, Godfrey's
Pinguicula ionantha

Bay

Liberty

Campion, Fringed
Silene polypetala

Gadsden

Chaffseed, American
Schwalbea americana

Gadsden

Fringe Tree, Pygmy

Chionanthus pygmaeus

Hardee
Highlands

Lake
Osceola

Polk

Gooseberry, Miccosukee
Ribes echinellum

Jefferson

Gourd, Okeechobee
Cucurbita okeechobeensis ssp. okeechobeensis

Palm Beach

Harebells, Avon Park
Crotalaria avonensis

Highlands
Polk

Hypericum, Highlands Scrub
Hypericum cumulicola

Highlands
Polk

Jacquemontia, Beach
Jacquemontia reclinata

Dicot

Broward
Dade
Palm Beach

Lead-plant, Crenulate
Amorpha crenulata

Dade
Dade

Lupine, Scrub
Lupinus aridorum

Orange
Polk

Meadowrue, Cooley's
Meadowrue, Cooley's
Thalictrum cooleyi

Walton
Walton

Milkpea, Small's
Galactia smallii

Dade

Mint, Garrett's
Dicerandra christmanii

Highlands

Mint, Longspurred *Dicerandra*

Marion

Mint, Scrub
Dicerandra frutescens

Highlands

Mustard, Carter's
Warea carteri

Highlands

Polk

Pawpaw, Beautiful
Deeringothamnus pulchellus

Charlotte
Lee
Orange

Pawpaw, Four-petal
Asimina tetramera

Martin
Palm Beach

Pawpaw, Rugel's
Deeringothamnus rugelii

Volusia

Pinkroot, Gentian
Spigelia gentianoides

US EPA ARCHIVE DOCUMENT

Dicot

Jackson

Plum, Scrub

Prunus geniculata

Highlands
Lake
Osceola
Polk

Polygala, Lewton's

Polygala lewtonii

Highlands
Lake
Marion
Osceola
Polk

Polygala, Tiny

Polygala smallii

Broward
Dade
Martin
Palm Beach

Rhododendron, Chapman

Rhododendron chapmanii

Clay
Gadsden
Liberty

Rosemary, Apalachicola

Conradina glabra

Liberty

Rosemary, Etonia

Conradina etonia

Putnam

Rosemary, Short-leaved

Conradina brevifolia

Highlands
Polk

Sandlace

Polygonella myriophylla

Highlands
Orange
Osceola
Polk

Skullcap, Florida

ponceanus

Scutellaria floridana

Liberty

Dicot

Snakeroot

Eryngium cuneifolium

Highlands
Putnam

Spurge, Deltoid

Chamaesyce deltoidea ssp.

Dade

Spurge, Garber's

Chamaesyce garberi

Dade

Spurge, Telephus

Euphorbia telephioides

Bay

Warea, Wide-leaf

Warea amplexifolia

Lake
Osceola
Polk

Whitlow-wort, Papery

Paronychia chartacea

Highlands
Lake
Orange
Osceola
Polk

Wings, Pigeon

Clitoria fragrans

Highlands
Lake
Polk

Wireweed

Polygonella basiramia

Highlands
Polk

Ziziphus, Florida

Ziziphus celata

Highlands
Polk

Fish

Darter, Okaloosa

Etheostoma okaloosae

Okaloosa
Walton

Fish

Sawfish, Smalltooth

Pristis pectinata

Charlotte
Dade
Hillsborough
Lee

Sturgeon, Gulf

Acipenser oxyrinchus desotoi

Bay
Calhoun
Citrus
Columbia
Dixie
Escambia
Gadsden
Gilchrist
Hamilton
Hillsborough
Holmes
Jackson
Jefferson
Lafayette
Levy
Liberty
Madison
Manatee
Okaloosa
Pasco
Pinellas
Santa Rosa
Suwannee
Wakulla
Walton
Washington

Sturgeon, Shortnose

Acipenser brevirostrum

Clay
Duval
Putnam

Insect

Butterfly, Schaus Swallowtail

Heraclides aristodemus

Dade

Lichen

US EPA ARCHIVE DOCUMENT

Lichen

Cladonia, Florida Perforate
Cladonia perforata
Highlands
Martin
Okaloosa
Palm Beach
Polk

Mammal

Bat, Gray
Myotis grisescens
Jackson

Bat, Indiana
Myotis sodalis
Jackson

Mouse, Choctawhatchee Beach
Peromyscus polionotus allophrys
Bay
Walton

Mouse, Perdido Key Beach
Peromyscus polionotus trissyllepsis
Escambia

Panther, Florida
Puma (=Felis) concolor coryi
Broward
Charlotte
Dade
Hendry
Highlands
Lee
Osceola
Palm Beach
Polk

Vole, Florida Salt Marsh
Microtus pennsylvanicus
Levy

Marine mml

Manatee, West Indian

Trichechus manatus

Bay

Broward

Charlotte

Citrus

Clay

Marine mml

Dixie
Duval
Hendry
Hillsborough
Lake
Lee
Levy
Manatee
Marion

Martin
Nassau
Palm Beach

Pasco
Pinellas
Putnam

Seminole
Volusia
Wakulla

Monocot

Beargrass, Britton's
Nolina brittoniana
Highlands
Lake
Orange
Osceola
Polk

Beauty, Harper's
Harperocallis flava
Liberty

Seagrass, Johnson's
Halophila johnsonii
Broward
Martin
Palm Beach

Reptile

Crocodile, American

Crocodylus acutus

Broward

Dade

Lee

Sea turtle, green

Chelonia mydas

Bay

Reptile

Charlotte
Citrus
Dade
Dixie
Duval
Escambia
Hillsborough
Lee
Levy

Manatee
Martin
Nassau

Okaloosa
Palm Beach
Pasco

Pinellas
Santa Rosa
Volusia
Walton

Sea turtle, hawksbill
Eretmochelys imbricata
Broward
Dade
Duval
Martin
Nassau
Palm Beach
Pasco
Volusia

Sea turtle, Kemp's ridley
Lepidochelys kempii
Lee
Pasco
Pinellas
Volusia

Sea turtle, leatherback
Dermochelys coriacea

Bay

Broward

Charlotte

Citrus

Dade

Dixie

Duval

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US EPA ARCHIVE DOCUMENT

Reptile

Escambia
Hillsborough
Lee
Levy
Manatee
Martin
Nassau
Okaloosa
Palm Beach
Pasco
Pinellas
Santa Rosa
Volusia
Walton

Sea turtle, loggerhead
Caretta caretta

Bay
Broward
Charlotte
Citrus
Dade
Dixie
Duval
Escambia
Hillsborough
Lee
Levy
Manatee
Martin
Nassau
Okaloosa
Palm Beach
Pasco
Pinellas
Santa Rosa
Volusia
Walton

Skink, Blue-tailed Mole
Eumeces egregius lividus

Highlands
Osceola
Polk

Skink, Sand
Neoseps reynoldsi

Reptile

Highlands
Lake
Marion
Orange
Osceola
Polk

Snake, Atlantic Salt Marsh
Nerodia clarkii taeniata

Volusia

Snake, Eastern Indigo
Drymarchon corais couperi

Alachua
Baker
Bay
Bradford
Broward
Calhoun
Charlotte
Citrus
Clay
Columbia
Dade
Dixie
Duval
Escambia
Gadsden
Gilchrist
Hamilton
Hardee
Hendry
Highlands
Hillsborough
Holmes
Jackson
Jefferson
Lafayette
Lake
Lee
Leon
Levy
Liberty
Madison
Manatee
Marion

Reptile

Martin
Nassau
Okaloosa
Orange
Osceola
Palm Beach
Pasco
Pinellas
Polk
Putnam
Santa Rosa
Seminole
Sumter
Suwannee
Union
Volusia
Wakulla
Walton
Washington

Georgia

Amphibian

Salamander, Flatwoods
Ambystoma cingulatum

Baker
Evans
Liberty
Miller

Bird

Plover, Piping
Charadrius melodus

Camden
Chatham
Glynn
Liberty
Marion

Stork, Wood
Mycteria americana

Appling
Atkinson
Bacon
Baker
Baldwin
Ben Hill

US EPA ARCHIVE DOCUMENT

Bird

Berrien
Bibb
Bleckley
Brantley
Brooks
Bulloch
Burke
Calhoun
Camden
Candler
Charlton
Chatham
Clay
Clinch
Coffee
Colquitt
Columbia
Cook
Crawford
Crisp
Decatur
Dodge
Dooly
Dougherty
Early
Echols
Effingham
Emanuel
Evans
Floyd
Glascock
Glynn
Grady
Hancock
Houston
Irwin
Jeff Davis
Jefferson
Jenkins
Johnson
Jones
Lanier
Laurens
Lee

Bird

Liberty
Long
Lowndes
Macon
Marion
McDuffie
Miller
Mitchell
Montgomery
Muscogee
Peach
Pierce
Pulaski
Quitman
Randolph
Richmond
Schley
Screven
Seminole
Stewart
Sumter
Talbot
Tattnall
Taylor
Telfair
Terrell
Thomas
Tift
Toombs
Treutlen
Turner
Twiggs
Ware
Warren
Washington
Wayne
Webster
Wheeler
Wilcox
Wilkinson
Worth

Warbler (=Wood), Kirtland's
Dendroica kirtlandii
Camden

Bird

Chatham
Glynn
Liberty
Long

Woodpecker, Red-cockaded
Picoides borealis
Appling
Atkinson
Bacon
Baker
Baldwin
Banks
Ben Hill
Berrien
Bibb
Bleckley
Brantley
Brooks
Bulloch
Burke
Butts
Calhoun
Camden
Candler
Carroll
Charlton
Chatham
Clarke
Clay
Clinch
Cobb
Coffee
Colquitt
Columbia
Cook
Coweta
Crawford
Crisp
Decatur
Dodge
Dooly
Dougherty
Early
Echols

US EPA ARCHIVE DOCUMENT

Bird

Effingham
Elbert
Emanuel
Evans
Fayette
Floyd
Forsyth
Franklin
Fulton
Glascock
Glynn
Grady
Greene
Gwinnett
Hall
Hancock
Haralson
Harris
Hart
Heard
Henry
Houston
Irwin
Jasper
Jeff Davis
Jefferson
Jenkins

Johnson
Jones
Lamar
Lanier
Laurens
Lee

Liberty
Lincoln
Long

Lowndes
Macon
Madison

Marion
Meriwether
Miller
Mitchell
Monroe

Bird

Montgomery
Morgan
Muscogee
Newton
Oconee
Oglethorpe
Paulding
Peach
Pierce
Pike
Pulaski
Quitman
Randolph
Richmond
Rockdale
Schley
Screven
Seminole
Spalding
Stephens
Stewart
Sumter
Talbot
Taliaferro
Tattnall
Taylor
Telfair

Terrell
Thomas
Tift
Toombs
Treutlen
Troup

Turner
Twiggs
Upson

Walton
Ware
Warren

Washington
Wayne
Webster
Wheeler
Wilcox

Bird

Wilkes
Wilkinson
Worth

Bivalve

Bankclimber, Purple
Elliptoideus sloatianus
Baker
Coweta
Crawford
Crisp
Decatur
Dooly
Dougherty
Lee
Macon
Mitchell
Muscogee
Worth

Combshell, Upland
Epioblasma metastriata
Bartow
Chattooga
Floyd

Fanshell
Cyprogenia stegaria
Lincoln

Kidneyshell, Triangular
Ptychobranchus greenii
Bartow
Chattooga
Cherokee
Floyd

Mucket, Pink (Pearlymussel)
Lampsilis abrupta
Calhoun

Mussel, Acornshell Southern
Epioblasma othcaloogensis
Chattooga

Mussel, Alabama Moccasinshell
Medionidus acutissimus
Bartow
Chattooga
Floyd

US EPA ARCHIVE DOCUMENT

Bivalve

Mussel, Coosa Moccasinshell
Medionidus parvulus
Chattooga
Floyd
Mussel, Fine-lined Pocketbook

Lampsilis altilis
Floyd
Mussel, Gulf Moccasinshell
Medionidus penicillatus
Baker
Calhoun
Coweta
Crisp
Decatur
Dooly
Dougherty
Fulton
Harris
Lee
Meriwether
Muscogee
Pike
Sumter
Taylor
Terrell
Webster
Worth
Mussel, Oval Pigtoe
Pleurobema pyriforme
Baker
Coweta
Crisp
Dooly
Early
Lee
Macon
Meriwether
Miller
Muscogee
Spalding
Sumter
Taylor
Terrell
Webster

Bivalve

Worth
Mussel, Ovate Clubshell
Pleurobema perovatum
Bartow
Cherokee

Floyd
Mussel, Shiny-rayed Pocketbook
Lampsilis subangulata
Baker
Coweta
Crisp
Decatur
Dougherty
Early
Fulton
Lee
Macon
Meriwether
Miller
Muscogee
Pike
Seminole
Spalding
Sumter
Taylor
Terrell
Webster
Worth
Mussel, Southern Clubshell
Pleurobema decisum
Chattooga
Cherokee
Floyd
Mussel, Southern Pigtoe
Pleurobema georgianum
Chattooga
Floyd
Threeridge, Fat (Mussel)
Amblema neislerii
Decatur
Dougherty
Macon

Conf/cycds

Conf/cycds

Torreya, Florida
Torreya taxifolia
Decatur

Dicot

Amphianthus, Little
Amphianthus pusillus
Butts
Columbia
Greene
Gwinnett
Hancock
Harris
Heard
Henry
Meriwether
Newton
Oglethorpe
Pike
Rockdale
Walton
Barbara Buttons, Mohr's
Marshallia mohrii
Cherokee
Floyd
Campion, Fringed
Silene polypetala
Bibb
Crawford
Decatur
Talbot
Taylor
Upson
Dropwort, Canby's
Oxypolis canbyi
Burke
Dooly
Jenkins
Lee
Screven
Sumter
Harperella
Ptilimnium nodosum
Greene

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Dicot

Pitcher-plant, Green
Sarracenia oreophila
Chattooga
Taylor
Troup
Pondberry
Lindera melissifolia
Wheeler
Rattleweed, Hairy
Baptisia arachnifera
Brantley
Wayne
Skullcap, Large-flowered
Scutellaria montana
Chattooga
Floyd
Sumac, Michaux's
Rhus michauxii
Elbert

Ferns

Quillwort, Black-spored
Isoetes melanospora
Butts
Greene
Gwinnett
Heard
Newton
Pike
Rockdale

Quillwort, Mat-forming
Isoetes tegetiformans
Columbia
Greene
Gwinnett
Hancock
Rockdale

Fish

Darter, Amber

Percina antesella

Chattooga

Cherokee

Forsyth

Darter, Cherokee
Etheostoma scotti

Fish

Bartow
Cherokee
Cobb
Fulton
Darter, Etowah
Etheostoma etowahae
Bartow
Cherokee
Cobb
Fulton
Logperch, Conasauga
Percina jenkinsi
Chattooga
Shiner, Blue
Cyprinella caerulea
Floyd
Sturgeon, Gulf
Acipenser oxyrinchus desotoi
Decatur
Seminole
Sturgeon, Shortnose
Acipenser brevirostrum
Appling
Brantley
Burke
Camden
Chatham
Effingham
Glynn
Jeff Davis

Liberty
Long
Marion
Montgomery
Pierce
Richmond
Screven
Tattnall

Telfair

Toombs

Wayne

Wheeler

Insect

Insect

Beetle, American Burying
Nicrophorus americanus
Lamar

Mammal

Bat, Gray
Myotis grisescens
Bartow
Butts
Chattooga
Cherokee
Clarke
Floyd
Gwinnett
Haralson
Paulding
Upson
Bat, Indiana
Myotis sodalis
Banks
Bartow
Butts
Calhoun
Carroll
Chattooga
Cherokee
Clarke
Clay
Cobb
Coweta
Crawford
Crawford
Early
Fayette
Floyd
Forsyth
Fulton
Gwinnett
Hall
Haralson

Harris
Harris
Heard
Heard
Henry
Henry
Jasper
Jasper
Lamar

Madison

US EPA ARCHIVE DOCUMENT

Mammal

Marion
Meriwether
Miller
Monroe
Morgan
Muscogee
Newton
Oconee
Paulding
Pike
Quitman
Randolph
Rockdale
Schley
Seminole
Spalding
Stephens
Stewart
Talbot
Terrell
Troup
Union
Upson
Walton

Webster

Bat, Virginia Big-eared
Corynorhinus (=Plecotus) townsendii virginianus

Clinch

Marine mml

Manatee, West Indian

Trichechus manatus

Camden
Charlton
Chatham
Glynn
Liberty

Monocot

Grass, Tennessee Yellow-eyed
Xyris tennesseensis

Bartow

Pogonia, Small Whorled
Isotria medeoloides

Bartow

Monocot

Chattooga
Cherokee
Floyd
Union

Trillium, Persistent
Trillium persistens

Stephens

Trillium, Relict
Trillium reliquum

Bibb
Clay
Columbia
Early
Lee
Macon
Muscogee
Quitman
Talbot
Upson

Water-plantain, Kral's
Sagittaria secundifolia

Chattooga

Reptile

Sea turtle, loggerhead
Caretta caretta

Camden
Chatham
Chatham
Glynn
Liberty
Marion

Snake, Eastern Indigo

Drymarchon corais couperi

Appling
Atkinson
Bacon
Baker
Ben Hill
Berrien
Bibb
Bleckley
Brantley
Brooks
Bulloch
Burke

Reptile

Calhoun
Camden
Candler
Charlton
Chatham
Clay
Clinch
Coffee
Colquitt
Cook
Crawford
Crisp
Decatur
Dodge
Dooly
Dougherty
Early
Echols
Effingham
Emanuel
Evans
Glynn
Grady
Houston

Irwin
Jeff Davis
Jenkins
Jenkins
Johnson
Lanier
Laurens
Lee

Liberty
Liberty
Long
Lowndes
Macon
Marion
Miller
Mitchell
Montgomery
Pierce
Pulaski
Quitman
Randolph
Screven

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Reptile

Seminole
Stewart
Sumter
Tattnall
Taylor
Telfair
Terrell
Thomas
Tift
Toombs
Treutlen
Turner
Twiggs
Ware
Washington
Wayne
Webster
Wheeler
Wilcox
Worth

Hawaii

Arachnid

Spider, Kauai Cave Wolf
Gopherus polyphemus
Kauai

Bird

'Akepa, Hawaii
Loxops coccineus coccineus
Hawaii

'Akepa, Maui
Loxops coccineus ochraceus
Maui

'Akia Loa, Kauai (Hemignathus procerus)

Hemignathus procerus
Kauai

'Akia Pola'au (Hemignathus munroi)
Hemignathus munroi

Hawaii

Albatross, Short-tailed
Phoebastria (=Diomedea) albatrus

Honolulu

Bird

Coot, Hawaiian (=Alae keo keo)
Fulica americana alai
Hawaii
Honolulu
Kauai
Maui

Creeper, Hawaii
Oreomystis mana
Hawaii

Creeper, Molokai (Kakawahie)
Paroreomyza flammea
Maui

Creeper, Oahu (Alauwahio)
Paroreomyza maculata
Honolulu

Crow, Hawaiian ('Alala)
Corvus hawaiiensis
Hawaii

Duck, Hawaiian (Koloa)
Anas wyvilliana

Hawaii
Honolulu
Kauai

Duck, Laysan
Anas laysanensis
Honolulu

Elepaio, Oahu
Chasiempis sandwichensis ibidis
Honolulu

Finch, Laysan
Telespyza cantans
Honolulu

Finch, Nihoa
Telespyza ultima

Honolulu

Goose, Hawaiian (Nene)
Branta (=Nesochen) sandvicensis
Hawaii

Kauai

Maui

Hawk, Hawaiian (Io)
Buteo solitarius

Hawaii

Bird

Honeycreeper, Crested
Palmeria dolei
Maui

Millerbird, Nihoa
Acrocephalus familiaris kingi
Honolulu

Moorhen, Hawaiian Common
Gallinula chloropus sandvicensis
Honolulu
Kauai
Maui

Nuku Pu'u
Hemignathus lucidus
Kauai
Maui

'O'o, Kauai (='A'a)
Moho braccatus
Kauai

'O'u (Honeycreeper)
Psittirostra psittacea

Hawaii
Kauai

Palila
Loxioides bailleui
Hawaii

Parrotbill, Maui
Pseudonestor xanthophrys
Maui

Petrel, Hawaiian Dark-rumped
Pterodroma phaeopygia
Hawaii
Kauai
Maui

Po'ouli

Melamprosops phaeosoma

Maui

Shearwater, Newell's Townsend's
Puffinus auricularis newelli

Hawaii

Honolulu
Kauai
Kauai

Stilt, Hawaiian (=Ae'o)
Stilt, Hawaiian (=Ae'o)
Himantopus mexicanus knudseni
Hawaii

US EPA ARCHIVE DOCUMENT

US EPA ARCHIVE DOCUMENT

Bird

Honolulu
Kauai
Maui

Thrush, Large Kauai
Myadestes myadestinus
Kauai

Thrush, Molokai (Oloma'o)
Myadestes lanaiensis rutha
Maui

Thrush, Small Kauai (Puaiohi)
Myadestes palmeri
Kauai

Crustacean

Amphipod, Kauai Cave
Spelaeorchestia koloana

Kauai

Dicot

Abutilon eremitopetalum (ncn)
Abutilon eremitopetalum

Maui

Abutilon sandwicense (ncn)

Abutilon sandwicense
Honolulu

Achyranthes mutica (ncn)
Achyranthes mutica
Hawaii

Achyranthes splendens var. rotundata (ncn)
Achyranthes splendens var.
Honolulu

A'e (Zanthoxylum dipetalum var. tomentosum)

Zanthoxylum dipetalum var. tomentosum
Hawaii

A'e (Zanthoxylum hawaiiense)

Zanthoxylum hawaiiense
Hawaii
Kauai
Maui

'Aiea (Nothocestrum breviflorum)
Nothocestrum breviflorum
Hawaii

Dicot

'Aiea (Nothocestrum peltatum)
Nothocestrum peltatum
Kauai

'Akoko (Chamaesyce celastroides var. kaenana)
Chamaesyce celastroides var.
Honolulu

'Akoko (Chamaesyce deppeana)
Chamaesyce deppeana
Honolulu

'Akoko (Chamaesyce herbstii)
Chamaesyce herbstii
Honolulu

'Akoko (Chamaesyce kuwaleana)
Chamaesyce kuwaleana

Honolulu

'Akoko (Chamaesyce rockii)
Chamaesyce rockii
Honolulu

'Akoko (Chamaesyce skottsbergii var. skottsbe
Chamaesyce skottsbergii var. kalaeloana

Honolulu
Maui

'Akoko (Euphorbia haeleeleana)
Euphorbia haeleeleana
Honolulu

Kauai

Alani (Melicope adscendens)
Melicope adscendens
Maui

Alani (Melicope balloui)
Melicope balloui
Melicope balloui
Maui

Alani (Melicope haupuensis)
Melicope haupuensis
Kauai

Alani (Melicope knudsenii)
Melicope knudsenii
Kauai

Maui

Alani (Melicope lydgatei)
Melicope lydgatei
Honolulu

Dicot

Alani (Melicope mucronulata)
Melicope mucronulata
Maui

Alani (Melicope munroi)
Melicope munroi
Maui

Alani (Melicope ovalis)
Melicope ovalis
Maui

Alani (Melicope pallida)
Melicope pallida
Kauai

Alani (Melicope quadrangularis)
Melicope quadrangularis
Melicope quadrangularis
Kauai

Alani (Melicope reflexa)
Melicope reflexa
Maui

Alani (Melicope saint-johnii)
Melicope saint-johnii
Melicope saint-johnii
Honolulu

Alani (Melicope zahlbruckneri)
Alani (Melicope zahlbruckneri)
Melicope zahlbruckneri
Hawaii

Alsinidendron obovatum (ncn)
Alsinidendron obovatum
Honolulu

Alsinidendron trinerve (ncn)
Alsinidendron trinerve
Honolulu

Alsinidendron viscosum (ncn)
Alsinidendron viscosum
Alsinidendron viscosum
Kauai
Kauai

Amaranthus brownii (ncn)
Amaranthus brownii
Honolulu

'Anaunau (Lepidium arbuscula)
Lepidium arbuscula
Honolulu

'Anunu (Sicyos alba)
'Anunu (Sicyos alba)
Sicyos alba
Hawaii

Aupaka (Isodendrion hosakae)
Isodendrion hosakae

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Hawaii
Aupaka (Isodendrion laurifolium)
Isodendrion laurifolium
Honolulu
Kauai

Aupaka (Isodendrion longifolium)
Isodendrion longifolium
Honolulu
Kauai
'Awikiwiki (Canavalia molokaiensis)
Canavalia molokaiensis
Maui
'Awiwi (Centaurium sebaeoides)
Centaurium sebaeoides
Kauai

Maui
'Awiwi (Hedyotis cookiana)
Hedyotis cookiana
Hawaii
Kauai

Bonamia menziesii (ncn)

Bonamia menziesii

Hawaii
Honolulu

Kauai
Maui
Chamaesyce Halemanui (ncn)

Chamaesyce halemanui
Kauai
Cyanea undulata (ncn)

Cyanea undulata
Kauai
Delissea rhytodisperma (ncn)

Delissea rhytidosperma
Kauai

Dubautia latifolia (ncn)
Dubautia latifolia
Kauai

Dubautia pauciflorula (ncn)
Dubautia pauciflorula
Kauai

Geranium, Hawaiian Red-flowered

Geranium arboreum

Maui

Dicot

Gouania hillebrandii (ncn)
Gouania hillebrandii
Maui
Gouania meyenii (ncn)
Gouania meyenii

Honolulu
Kauai
Gouania vitifolia (ncn)
Gouania vitifolia
Honolulu
Haha (Cyanea acuminata)
Cyanea acuminata
Honolulu
Haha (Cyanea asarifolia)
Cyanea asarifolia

Kauai
Haha (Cyanea copelandii ssp. copelandii)
Cyanea copelandii ssp. copelandii
Hawaii

Haha (Cyanea copelandii ssp. haleakalaensis)

Cyanea copelandii ssp.
Maui

Haha (Cyanea Crispa) (=Rollandia crispa)
Cyanea (=Rollandia) crispa
Honolulu

Haha (Cyanea dunbarii)
Cyanea dunbarii
Maui

Haha (Cyanea glabra)
Cyanea glabra
Maui

Haha (Cyanea grimesiana ssp. grimesiana)
Cyanea grimesiana ssp. grimesiana

Honolulu
Maui

Haha (Cyanea grimesiana ssp.
Cyanea grimesiana ssp. obatae
Honolulu

Haha (Cyanea hamatiflora ssp. carlsonii)

Cyanea hamatiflora carlsonii

Dicot

Hawaii
Haha (Cyanea hamatiflora ssp. hamatiflora)
Cyanea hamatiflora ssp.
Maui

Haha (Cyanea humboldtiana)
Cyanea humboldtiana
Honolulu
Haha (Cyanea koolauensis)
Cyanea koolauensis
Honolulu
Haha (Cyanea longiflora)
Cyanea longiflora
Honolulu
Haha (Cyanea Macrostegia var. gibsonii)
Cyanea macrostegia ssp. gibsonii
Maui

Haha (Cyanea mannii)
Cyanea mannii
Maui

Haha (Cyanea mceldowneyi)

Cyanea mceldowneyi
Maui

Haha (Cyanea pinnatifida)
Cyanea pinnatifida
Honolulu

Haha (Cyanea platyphylla)
Cyanea platyphylla
Hawaii

Haha (Cyanea procera)
Cyanea procera
Maui

Haha (Cyanea recta)
Cyanea recta

Kauai

Haha (Cyanea remyi)
Cyanea remyi
Kauai

Haha (Cyanea shipmanii)
Cyanea shipmannii
Hawaii

Haha (Cyanea stictophylla)

Cyanea stictophylla

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Hawaii

var.
Haha (Cyanea St-Johnii)
(=Rollandia St-Johnii)
wahiawaensis
Cyanea st-johnii

Honolulu
Haha (Cyanea superba)
Cyanea superba

Honolulu
Ha'lwale (Cyrtandra crenata)
Cyrtandra crenata

Honolulu
Ha'lwale (Cyrtandra dentata)
Cyrtandra dentata

Honolulu
Ha'lwale (Cyrtandra giffardii)
Cyrtandra giffardii
Hawaii

Ha'lwale (Cyrtandra limahuliensis)
Cyrtandra limahuliensis
Kauai
Ha'lwale (Cyrtandra munroi)
Cyrtandra munroi
Maui
Ha'lwale (Cyrtandra polyantha)
Cyrtandra polyantha
Honolulu
Ha'lwale (Cyrtandra subumbellata)
Cyrtandra subumbellata
Honolulu
Ha'lwale (Cyrtandra tintinnabula)
arnottianus ssp. immaculatus)
Cyrtandra tintinnabula
Honolulu

Ha'lwale (Cyrtandra viridiflora)
waimeae
Cyrtandra viridiflora
waimeae
Honolulu
Haplostachys Haplostachya (ncn)
Haplostachys haplostachya
Hawaii
Hau Kauhiwi (Hibiscadelphus woodi)
Hibiscadelphus woodii

Kauai
Hau Kuahiwi (Hibiscadelphus

Hibiscadelphus distans
Kauai

Dicot

Heau (Exocarpos luteolus)

Exocarpos luteolus
Kauai

Hedyotis degeneri (ncn)
Hedyotis degeneri
Honolulu

Hedyotis parvula (ncn)
Hedyotis parvula
Honolulu

Hedyotis St.-Johnii (ncn)
Hedyotis st.-johnii
Kauai

Hesperomannia arborescens (ncn)
Hesperomannia arborescens
Honolulu
Maui

Hesperomannia arbuscula (ncn)
Hesperomannia arbuscula
Honolulu
Maui
Hesperomannia lydgatei (ncn)
Hesperomannia lydgatei
Kauai
Hibiscus, Clay's
Hibiscus clayi
Kauai
Holei (Ochrosia kilaueaensis)
Ochrosia kilaueaensis
Hawaii
Iliau (Wilkesia hobdyi)

Wilkesia hobdyi
Kauai

Kamakahala (Labordia cyrtandrae)

Labordia cyrtandrae
ssp. hannerae)
Honolulu
Kamakahala (Labordia lydgatei)
Labordia lydgatei
Kauai
Kamakahala (Labordia tinifolia var.
lanaiensis)

Labordia tinifolia var. lanaiensis
Maui

Dicot

Kamakahala (Labordia tinifolia

wahiawaen)
Labordia tinifolia var.

Kauai

Kamakahala (Labordia triflora)
Labordia triflora
Maui

Kanaloa kahoolawensis (ncn)
Kanaloa kahoolawensis
Maui

Kauila (Colubrina oppositifolia)
Colubrina oppositifolia
Hawaii

Kaulu (Pteralyxia kauaiensis)
Pteralyxia kauaiensis
Kauai
Kio'Ele (Hedyotis coriacea)
Kio'Ele (Hedyotis coriacea)
Hedyotis coriacea
Hawaii
Maui
Kiponapona (Phyllostegia
Phyllostegia racemosa
Hawaii
Koki'o (Kokia drynarioides)
Kokia drynarioides
Hawaii
Koki'o (Kokia kauaiensis)
Kokia kauaiensis
Kauai
Koki'o Ke'oke'o (Hibiscus

arnottianus ssp. immaculatus)
Hibiscus arnottianus ssp.
Maui
Koki'o Ke'oke'o (Hibiscus

Koki'o Ke'oke'o (Hibiscus

Hibiscus waimeae ssp. hannerae
Kauai
Kolea (Myrsine juddii)
Myrsine juddii
Honolulu

Kolea (Myrsine linearifolia)
Myrsine linearifolia

Kauai

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Dicot

Ko'oko'olau (Bidens micrantha ssp. kalealaha)
Bidens micrantha ssp. kalealaha
Maui

Ko'oko'olau (Bidens wiebkei)
Bidens wiebkei
Maui
Ko'oloa'ula (Abutilon menziesii)
Abutilon menziesii
Hawaii
Maui

Kopa (Hedyotis schlechtendahliana
wahiawaensis
var. remyi)
wahiawaensis
Hedyotis schlechtendahliana var.

Maui

Kuawawaenohu (Alsinidendron lychnoides)

Alsinidendron lychnoides

Kauai
Kulu'l (Nototrichium humile)

Nototrichium humile
Honolulu

coriacea)
Maui
Laukahi Kuahiwi (Plantago

Plantago hawaiensis

Hawaii
Laukahi Kuahiwi (Plantago princeps)

Plantago princeps

Honolulu
Kauai
Maui

Laulihilihi (Schiedea stellarioides)
Schiedea stellarioides
Kauai
Lipochaeta venosa (ncn)
Lipochaeta venosa
Hawaii
Lobelia monostachya (ncn)
Lobelia monostachya
Honolulu
Lobelia niihauensis (ncn)
Lobelia niihauensis
Honolulu
Kauai

Dicot

Lobelia oahuensis (ncn)
Lobelia oahuensis
Honolulu

Lysimachia filifolia (ncn)
Lysimachia filifolia
Honolulu
Kauai
Lysimachia lydgatei (ncn)
Lysimachia lydgatei
Honolulu
Maui

Lysimachia maxima (ncn)

Lysimachia maxima (ncn)

Lysimachia maxima

Maui

Mahoe (Alectryon macrococcus)
Alectryon macrococcus

Honolulu

Kauai
Maui

Makou (Peucedanum sandwicense)
Peucedanum sandwicense

Honolulu
Kauai

Maui

Ma'o Hau Hele (Hibiscus
Hibiscus brackenridgei

Hawaii

Honolulu
Maui
Ma'oli'oli (Schiedea apokremnos)

Schiedea apokremnos
Kauai
Ma'oli'oli (Schiedea kealiae)
Schiedea kealiae
Honolulu
Mapele (Cyrtandra cyaneoides)
Cyrtandra cyaneoides
Kauai
Mehamehame (Flueggea
Flueggea neowawraea
Hawaii
Honolulu
Kauai

Dicot

Munroidendron racemosum (ncn)
Munroidendron racemosum
Kauai

Na'ena'e (Dubautia herbstobatae)
Gopherus polyphemus
Honolulu
Na'ena'e (Dubautia plantaginea ssp. humilis)
Dubautia plantaginea ssp. humilis
Maui
Nani Wai'ale'ale (Viola kauaensis var. wahiawaensis)
Viola kauaiensis var.

Viola kauaiensis var.

Kauai

Nanu (Gardenia mannii)
Gardenia mannii

Honolulu

Na'u (Gardenia brighamii)
Gardenia brighamii

Honolulu
Maui

Naupaka, Dwarf (Scaevola

Scaevola coriacea

Maui

Nehe (Lipochaeta fauriei)
Lipochaeta fauriei

Kauai

Nehe (Lipochaeta kamolensis)
Lipochaeta kamolensis
Maui

Nehe (Lipochaeta lobata var. leptophylla)
Lipochaeta lobata var. leptophylla
Honolulu
Nehe (Lipochaeta micrantha)
Lipochaeta micrantha
Kauai
Nehe (Lipochaeta tenuifolia)
Lipochaeta tenuifolia
Honolulu
Nehe (Lipochaeta waimeaensis)
Lipochaeta waimeaensis
Kauai
Neraudia angulata (ncn)

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Dicot

Honolulu
Neraudia ovata (ncn)
Neraudia ovata
Hawaii
Neraudia sericea (ncn)
Neraudia sericea
Hawaii
Maui
Nioi (Eugenia koolauensis)
Eugenia koolauensis
Honolulu
Nohoanu (Geranium multiflorum)
Geranium multiflorum
Hawaii
Maui
'Oha (Delissea rivularis)
Delissea rivularis
Kauai
'Oha (Delissea subcordata)
Delissea subcordata
Honolulu
'Oha (Delissea undulata)
Delissea undulata
Hawaii

'Oha (Lobelia gaudichaudii koolauensis)
Lobelia gaudichaudii ssp.
Honolulu

'Oha Wai (Clermontia
Clermontia drepanomorpha
Hawaii

'Oha Wai (Clermontia lindseyana)
Clermontia lindseyana
Hawaii
Maui

'Oha Wai (Clermontia oblongifolia ssp. brevipes)
Clermontia oblongifolia ssp. brevipes
Maui
'Oha Wai (Clermontia oblongifolia ssp. mauiensis)
Clermontia oblongifolia ssp.

Maui
'Oha Wai (Clermontia peleana)
Clermontia peleana

Dicot

Hawaii
'Oha Wai (Clermontia pyrularia)
Clermontia pyrularia
Hawaii
'Oha Wai (Clermontia samuelii)
Clermontia samuelii
Maui
'Ohai (Sesbania tomentosa)
Sesbania tomentosa
Hawaii
Honolulu
Kauai
Maui
'Ohe'ohe (Tetraplasandra
Tetraplasandra gymnocarpa
Honolulu
'Olulu (Brighamia insignis)
Brighamia insignis
Kauai
Opuhe (Urera kaalae)
Urera kaalae
Honolulu
Pamakani (Viola chamissoniana ssp. chamissoniana)
Viola chamissoniana ssp. chamissoniana

Honolulu
Phyllostegia hirsuta (ncn)
Phyllostegia hirsuta

Honolulu
Phyllostegia kaalaensis (ncn)
Phyllostegia kaalaensis

Honolulu
Phyllostegia knudsenii (ncn)
Phyllostegia knudsenii
Kauai

Phyllostegia mannii (ncn)
Phyllostegia mannii
Maui
Phyllostegia mollis (ncn)
Phyllostegia mollis

Honolulu
Maui

Dicot

Phyllostegia parviflora (ncn)
Phyllostegia parviflora
Honolulu
Phyllostegia velutina (ncn)
Phyllostegia velutina
Hawaii
Phyllostegia waimeae (ncn)
Phyllostegia waimeae
Kauai
Phyllostegia warshaueri (ncn)
Phyllostegia warshaueri
Hawaii
Phyllostegia wawrana (ncn)
Phyllostegia wawrana
Kauai
Pilo (Hedyotis mannii)
Hedyotis mannii
Maui
Po'e (Portulaca sclerocarpa)
Portulaca sclerocarpa
Hawaii
Maui
Popolo 'Aiakeakua (Solanum sandwicense)
Solanum sandwicense

Honolulu
Kauai
Popolo Ku Mai (Solanum
Solanum incompletum
Solanum incompletum
Hawaii
Pua'ala (Brighamia rockii)
Brighamia rockii
Brighamia rockii
Maui
Remya kauaiensis (ncn)
Remya kauaiensis
Kauai
Kauai
Remya montgomeryi (ncn)
Remya montgomeryi
Kauai
Remya, Maui
Remya, Maui
Remya mauiensis
Maui
Maui
Sandalwood, Lanai (='Iliahi)
Santalum freycinetianum var.

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Dicot

Maui

Sanicula mariversa (ncn)
Sanicula mariversa
Honolulu

Sanicula purpurea (ncn)
Sanicula purpurea
Maui

Schiedea haleakalensis (ncn)
Schiedea haleakalensis
Maui

Schiedea helleri (ncn)
Schiedea helleri
Kauai

Schiedea hookeri (ncn)
Schiedea hookeri
Honolulu

Schiedea kaalae (ncn)
Schiedea kaalae
Honolulu

Schiedea kauaiensis (ncn)
Schiedea kauaiensis
Kauai

Schiedea lydgatei (ncn)
Schiedea lydgatei
Maui

Schiedea membranacea (ncn)
Schiedea membranacea

Kauai
Schiedea nuttallii (ncn)
Schiedea nuttallii

Honolulu
Kauai

Schiedea sarmentosa (ncn)
Schiedea sarmentosa
Maui

Schiedea spergulina var. leiopoda
Schiedea spergulina var. leiopoda
Kauai

Schiedea spergulina var. spergulina (ncn)
Schiedea spergulina var.

Kauai

Schiedea verticillata (ncn)
Schiedea verticillata

Dicot

Honolulu

Schiedea, Diamond Head (Schiedea adamantis)
Schiedea adamantis
Honolulu

Silene alexandri (ncn)
Silene alexandri
Maui

Silene hawaiiensis (ncn)
Silene hawaiiensis
Hawaii

Silene lanceolata (ncn)
Silene lanceolata
Hawaii

Honolulu
Kauai
Maui

Silene perlmanii (ncn)
Silene perlmanii
Honolulu

Silversword, Haleakala ('Ahinahina)
Argyroxiphium sandwicense ssp. macrocephalum
Hawaii
Maui

Silversword, Ka'u (Argyroxiphium kauense)
Argyroxiphium kauense

Hawaii
Silversword, Mauna Kea
Argyroxiphium sandwicense ssp. sandwicense

Hawaii
Maui

Spermolepis hawaiiensis (ncn)
Spermolepis hawaiiensis

Hawaii

Honolulu
Kauai
Maui

Stenogyne angustifolia (ncn)
Stenogyne angustifolia var.

Hawaii

Stenogyne bifida (ncn)
Stenogyne bifida

Dicot

Maui

Stenogyne campanulata (ncn)
Stenogyne campanulata
Kauai

Stenogyne kanehoana (ncn)
Stenogyne kanehoana
Honolulu

Tetramolopium arenarium (ncn)
Tetramolopium arenarium
Hawaii

Tetramolopium capillare (ncn)
Tetramolopium capillare
Maui

Tetramolopium filiforme (ncn)
Tetramolopium filiforme
Honolulu

Tetramolopium lepidotum ssp. lepidotum (ncn)
Tetramolopium lepidotum ssp. lepidotum
Honolulu

Tetramolopium remyi (ncn)
Tetramolopium remyi
Maui
Tetramolopium rockii (ncn)
Tetramolopium rockii
Tetramolopium rockii
Maui

Trematolobelia singularis (ncn)
Trematolobelia singularis
Honolulu

Uhiuhi (Caesalpinia kavaiensis)
Caesalpinia kavaiense
Caesalpinia kavaiense
Hawaii
Honolulu

Maui

Ulihi (Phyllostegia glabra var. lanaiensis)
Phyllostegia glabra var. lanaiensis
Maui

Vetch, Hawaiian (Vicia menziesii)
Vicia menziesii

Hawaii

Vigna o-wahuensis (ncn)
Vigna o-wahuensis

Hawaii

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Dicot

Kauai
Maui
Viola helenae (ncn)
Viola helenae
Kauai
Viola lanaiensis (ncn)
Viola lanaiensis
Maui
Viola oahuensis (ncn)
Viola oahuensis
Honolulu
Wahine Noho Kula (Isodendrion pyrifolium)
Isodendrion pyrifolium
Hawaii

Xylosma crenatum (ncn)
Xylosma crenatum
curta)
Kauai

Ferns

Asplenium fragile var. insulare (ncn)

Asplenium fragile var. insulare

Hawaii

Diellia erecta (ncn)
Diellia erecta
Hawaii
Honolulu
Maui

Diellia falcata (ncn)

Diellia falcata
Honolulu
Diellia pallida (ncn)
Diellia pallida
Kauai
Diellia unisora (ncn)
Diellia unisora
Honolulu
Maui
Diplazium molokaiense (ncn)
Diplazium molokaiense
Maui
juddii)
Fern, Pendant Kihi (Adenophorus periens)
Adenophorus periens

Hawaii

Ferns

Kauai
Maui
'Ihi'Ihi (Marsilea villosa)
Marsilea villosa
Honolulu
Maui
Pauoa (Ctenitis squamigera)
Ctenitis squamigera
Honolulu
Maui
Pteris lidgatei (ncn)
Pteris lidgatei
Honolulu
Maui

Wawae'Iole (Phlegmariurus (=Huperzia) mannii)
Huperzia mannii

Hawaii
Maui
Wawae'Iole (Phlegmariurus (=Lycopodium) nutans)

Lycopodium (=Phlegmariurus)

Honolulu

Gastropod

Snail, Newcomb's
Erinna newcombi
Kauai

Snail, O'ahu Tree (Achatinella abbreviata)
Achatinella abbreviata
Honolulu
Snail, O'ahu Tree (Achatinella apexfulva)
Achatinella apexfulva
Honolulu
Snail, O'ahu Tree (Achatinella
Achatinella bellula
Honolulu
Snail, O'ahu Tree (Achatinella
Achatinella buddii

Honolulu

Snail, O'ahu Tree (Achatinella bulimoides)
Achatinella bulimoides

Honolulu

Gastropod

Snail, O'ahu Tree (Achatinella
Achatinella byronii
Honolulu
Snail, O'ahu Tree (Achatinella
Achatinella caesia
Honolulu
Snail, O'ahu Tree (Achatinella
Achatinella casta
Honolulu
Snail, O'ahu Tree (Achatinella
Achatinella cestus
Honolulu
Snail, O'ahu Tree (Achatinella concavospira)
Achatinella concavospira

Honolulu
Snail, O'ahu Tree (Achatinella

Achatinella curta
Honolulu
Snail, O'ahu Tree (Achatinella decipiens)
decipiens)
Achatinella decipiens

Honolulu
Snail, O'ahu Tree (Achatinella
Snail, O'ahu Tree (Achatinella
Achatinella decora
Honolulu
Snail, O'ahu Tree (Achatinella dimorpha)
Achatinella dimorpha
Achatinella dimorpha
Honolulu
Snail, O'ahu Tree (Achatinella
Achatinella elegans
Honolulu
Snail, O'ahu Tree (Achatinella
Achatinella fulgens
Honolulu
Snail, O'ahu Tree (Achatinella fuscobasis)
Achatinella fuscobasis
Honolulu
Snail, O'ahu Tree (Achatinella

Achatinella juddii
Honolulu

Snail, O'ahu Tree (Achatinella
Achatinella juncea

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Gastropod

Honolulu

Snail, O'ahu Tree (Achatinella lehuiensis)

Achatinella lehuiensis

Honolulu

Snail, O'ahu Tree (Achatinella leucorraphe)
Achatinella leucorraphe

Honolulu

Snail, O'ahu Tree (Achatinella lila)
Achatinella lila

Honolulu

Snail, O'ahu Tree (Achatinella livida)

Achatinella livida
hawaiiensis)

Honolulu

Snail, O'ahu Tree (Achatinella
Achatinella lorata
byrone)

Honolulu

Snail, O'ahu Tree (Achatinella

mustelina)

Achatinella mustelina

Honolulu

Snail, O'ahu Tree (Achatinella papyracea)

Achatinella papyracea

Honolulu

Snail, O'ahu Tree (Achatinella phaeozona)

Achatinella phaeozona

Honolulu

Snail, O'ahu Tree (Achatinella

pulcherrima)

Achatinella pulcherrima

Honolulu

Pritchardia kaalae

Snail, O'ahu Tree (Achatinella pupukanioe)
Achatinella pupukanioe

Honolulu

Snail, O'ahu Tree (Achatinella

Achatinella rosea

Gastropod

Snail, O'ahu Tree (Achatinella spaldingi)

Achatinella spaldingi

Honolulu

Snail, O'ahu Tree (Achatinella
Achatinella stewartii

Honolulu

Snail, O'ahu Tree (Achatinella swiftii)
Achatinella swiftii

Honolulu

Snail, O'ahu Tree (Achatinella taeniolata)
Achatinella taeniolata

Honolulu

Snail, O'ahu Tree (Achatinella thaanumi)

Achatinella thaanumi

Honolulu

Snail, O'ahu Tree (Achatinella

Achatinella turgida

Honolulu

Snail, O'ahu Tree (Achatinella
Achatinella valida

Honolulu

Insect

Moth, Blackburn's Sphinx
Manduca blackburni
Manduca blackburni

Hawaii

Maui

Mammal

Bat, Hawaiian Hoary
Lasiurus cinereus semotus

Hawaii

Honolulu

Kauai

Maui

Marine mml

Seal, Hawaiian Monk

Monocot

Bluegrass, Hawaiian
Poa sandvicensis
Poa sandvicensis

Kauai

Bluegrass, Mann's (Poa mannii)
Poa mannii

Kauai

Gahnia Lanaiensis (ncn)
Gahnia lanaiensis
Gahnia lanaiensis

Maui

Grass, Fosberg's Love
Eragrostis fosbergii
Eragrostis fosbergii

Honolulu

Hala Pepe (Pleomele

Pleomele hawaiiensis

Hawaii

Hilo Ischaemum (Ischaemum

Ischaemum byrone

Hawaii

Kauai

Maui

Kamanomano (Cenchrus agrimonioides)
Cenchrus agrimonioides

Honolulu

Honolulu

Maui

Lau'ehu (Panicum niihauense)
Lau'ehu (Panicum niihauense)
Panicum niihauense

Kauai

Lo`ulu (Pritchardia affinis)
Pritchardia affinis

Hawaii

Hawaii

Lo`ulu (Pritchardia kaalae)

Honolulu

Honolulu

Lo`ulu (Pritchardia munroi)
Pritchardia munroi

Maui

Maui

Lo`ulu (Pritchardia napaliensis)

Honolulu

Snail, O'ahu Tree (Achatinella sowerbyana)

Achatinella sowerbyana

Honolulu

Monachus schauinslandi

Hawaii

Honolulu

Kauai

Maui

Pritchardia napaliensis

Kauai

Lo`ulu (Pritchardia remota)

Pritchardia remota

Honolulu

Monocot

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Monocot

Lo`ulu (Pritchardia schattaueri)
Pritchardia schattaueri
Hawaii
Lo`ulu (Pritchardia viscosa)
Pritchardia viscosa
Kauai

Mariscus fauriei (ncn)
Mariscus fauriei
Hawaii
Maui
Mariscus pennatiformis (ncn)
Mariscus pennatiformis
Hawaii
Honolulu
Kauai
Maui

Panicgrass, Carter's (Panicum fauriei var.carteri)

Panicum fauriei var. carteri
Honolulu
Maui

Platanthera holochila (ncn)
Platanthera holochila
Kauai

Maui

Poa siphonoglossa (ncn)
Poa siphonoglossa
Kauai

Pu'uka'a (Cyperus trachysanthos)
Cyperus trachysanthos

Honolulu

Kauai
Wahane (Pritchardia aylmer-
Pritchardia aylmer-robinsonii

Kauai

Reptile

Sea turtle, green
Chelonia mydas

Hawaii
Honolulu
Kauai
Maui

Sea turtle, hawksbill

Reptile

Hawaii
Honolulu
Kauai
Maui

Idaho

Dicot

Catchfly, Spalding's
Silene spaldingii
Nez Perce
Howellia, Water
Howellia aquatilis
Kootenai
Latah

Fish

Salmon, Chinook (Snake River Fall Run)

Oncorhynchus (=Salmo)

Latah
Nez Perce
Salmon, Chinook (Snake River spring/summer)

Oncorhynchus (=Salmo)
Nez Perce

Salmon, Sockeye (Snake River population)

Oncorhynchus (=Salmo) nerka
Nez Perce

Steelhead, (Snake River Basin population)
Oncorhynchus (=Salmo) mykiss

Latah

Nez Perce
Sturgeon, White
Acipenser transmontanus

Boundary

Trout, Bull
Salvelinus confluentus

Ada

Benewah
Bonner
Boundary
Canyon

Gem

Fish

Latah
Nez Perce
Trout, Bull (Columbia River
Salvelinus confluentus

Ada
Benewah
Bonner
Bonner
Boundary
Canyon
Gem
Kootenai
Latah
Nez Perce
Payette
Trout, Bull (Klamath River
Salvelinus confluentus
Ada
Ada

Benewah
Bonner
Boundary
Canyon

Gem
Gem
Kootenai
Latah
Nez Perce
Nez Perce

Mammal

Bear, Grizzly
Ursus arctos horribilis
Ursus arctos horribilis
Bonner

Boundary

Caribou, Woodland
Rangifer tarandus caribou
Bonner

Boundary

Wolf, Gray
Canis lupus

Benewah

Bonner
Boundary
Kootenai

Illinois

Bird

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Bird

Tern, Interior (population) Least
Sterna antillarum
Alexander
Madison
Wabash

Bivalve

Fanshell
Cyprogenia stegaria
Whiteside

Mucket, Pink (Pearlymussel)
Lampsilis abrupta
Alexander

Pearlymussel, Fat Pocketbook
Potamilus capax
Pike
Wabash
Whiteside

Pearlymussel, Higgins' Eye
Lampsilis higginsii
Henderson
Jo Daviess
Mercer
Pike
Whiteside

Pearlymussel, Orange-footed
Plethobasus cooperianus
Alexander

Pearlymussel, White Wartyback
Plethobasus cicatricosus
Clark

Crustacean

Amphipod, Illinois Cave
Gammarus acherondytes

Monroe

Dicot

Aster, Decurrent False
Boltonia decurrens
Alexander
Brown
Calhoun
Greene
Jersey
Madison

Dicot

Marshall
Monroe
Morgan
Pike
Woodford

Clover, Leafy Prairie
Dalea foliosa

Will
Williamson

Clover, Prairie Bush
Lespedeza leptostachya
McHenry
Ogle

Winnebago

Daisy, Lakeside
Hymenoxys herbacea
Will

Milkweed, Mead's
Asclepias meadii
Saline
Will

Fish

Sturgeon, Pallid
Scaphirhynchus albus
Alexander
Madison
Monroe

Gastropod

Snail, Iowa Pleistocene
Discus macclintocki
Jo Daviess

Insect

Dragonfly, Hine's Emerald

Somatochlora hineana
Will

Mammal

Bat, Gray
Myotis grisescens
Alexander
Madison
Pike

Bat, Indiana
Myotis sodalis

Mammal

Alexander
Bond
Brown
Calhoun
Christian
Clark
Clinton

Franklin
Greene
Henderson
Jersey
Jo Daviess
Madison

Marion
Marshall
Mercer
Monroe
Morgan
Ogle
Pike
Saline
Sangamon
Stephenson
Wabash
Warren
Washington
Wayne
Whiteside

Williamson
Winnebago
Woodford

Monocot

Orchid, Eastern Prairie Fringed
Platanthera leucophaea

McHenry

Indiana

Bird

Plover, Piping
Charadrius melodus
Porter

Bivalve

Fanshell
Cyprogenia stegaria

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Bivalve

Carroll
Daviess
Lawrence

Mucket, Pink (Pearlymussel)
Lampsilis abrupta

Clark
Dearborn
Harrison
Jefferson
Warrick

Mussel, Clubshell
Pleurobema clava
Carroll

Mussel, Ring Pink (=Golf Stick
Obovaria retusa
Harrison

Mussel, Rough Pigtoe
Pleurobema plenum
Carroll

Pearlymussel, Fat Pocketbook
Potamilus capax
Carroll

Pearlymussel, Tubercled-blossom
Epioblasma torulosa torulosa
Carroll

Pearlymussel, White Cat's Paw
Epioblasma obliquata perobliqua
Allen

Dicot

Clover, Running Buffalo
Trifolium stoloniferum
Dearborn

Goldenrod, Short's
Solidago shortii
Harrison

Thistle, Pitcher's
Cirsium pitcheri
Porter

Insect

Butterfly, Karner Blue
Lycaeides melissa samuelis

Porter

Insect

Butterfly, Mitchell's Satyr
Neonympha mitchellii mitchellii
Lagrange

Mammal

Bat, Gray
Myotis grisescens
Clark
Harrison
Jennings

Bat, Indiana
Myotis sodalis
Allen
Boone
Carroll
Clark
Clay
Daviess
Dearborn
Elkhart
Greene
Hancock
Harrison
Huntington
Jefferson
Jennings
Johnson
Lagrange
Lawrence
Morgan
Orange
Owen
Porter
Putnam
Scott
Starke
Warrick
Washington

Iowa

Bird

Plover, Piping
Charadrius melodus
Polk

Bivalve

Pearlymussel, Fat Pocketbook
Potamilus capax
Des Moines

Pearlymussel, Higgins' Eye
Lampsilis higginsii

Allamakee
Clinton
Des Moines
Dubuque
Jackson
Lee
Louisa
Scott

Dicot

Clover, Prairie Bush
Lespedeza leptostachya
Allamakee
Bremer
Butler
Cedar
Cerro Gordo
Clinton
Decatur
Des Moines
Dubuque
Greene
Hamilton
Hardin
Harrison
Howard
Jackson
Jones
Lee
Louisa
Lucas
Mills
Polk
Ringgold
Scott
Shelby

Tama
Tama
Van Buren
Van Buren
Winneshiek

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Dicot

Milkweed, Mead's
Asclepias meadii
Decatur
Lucas
Ringgold

Monkshood, Northern Wild
Aconitum noveboracense
Allamakee
Dubuque
Hardin
Jackson

Ferns

Fern, American hart's-tongue
Asplenium scolopendrium var. americanum
Cerro Gordo

Fish

Shiner, Topeka
Notropis topeka (=tristis)
Greene
Hamilton

Sturgeon, Pallid
Scaphirhynchus albus
Harrison
Mills

Gastropod

Snail, Iowa Pleistocene
Discus macclintocki
Clinton
Dubuque
Jackson
Winneshiek

Mammal

Bat, Indiana
Myotis sodalis
Cedar
Decatur
Des Moines
Dubuque
Harrison
Lee
Louisa
Lucas

Mammal

Mills
Polk
Ringgold
Scott
Van Buren

Monocot

Orchid, Eastern Prairie Fringed
Platanthera leucophaea
Cedar
Decatur
Des Moines
Jackson
Jones
Lee
Louisa
Lucas
Scott
Van Buren

Orchid, Western Prairie Fringed
Platanthera praeclara
Bremer
Butler
Cedar
Cerro Gordo
Clinton
Decatur
Des Moines
Dubuque
Greene
Hamilton
Hardin
Harrison
Howard
Jackson
Lee
Linn
Louisa
Lucas
Mills
Polk
Ringgold
Scott
Shelby
Tama

Monocot

Van Buren

Kansas

Bird

Crane, Whooping
Grus americana
Cowley
Douglas
Ford
Harvey
Jefferson
Marion
McPherson
Osage
Reno
Reno
Rice
Riley
Sedgwick
Shawnee
Stafford
Sumner
Wabaunsee

Plover, Piping
Charadrius melodus
Cowley
Ford
Reno
Rice
Sedgwick
Stafford
Sumner

Tern, Interior (population) Least
Sterna antillarum
Cowley
Ford
Ford
Reno
Rice
Sedgwick
Stafford
Sumner

Dicot

Milkweed, Mead's
Asclepias meadii
Allen

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Dicot

Anderson
Bourbon
Crawford
Douglas
Franklin
Jefferson
Linn
Miami
Neosho

Fish

Madtom, Neosho
Noturus placidus
Allen
Cherokee
Labette
Lyon
Marion
Morris
Neosho
Woodson

Shiner, Arkansas River
Notropis girardi
Cowley
Ford
Reno
Rice
Sedgwick
Sumner

Shiner, Topeka
Notropis topeka (=tristis)
Butler
Geary
Lyon
Marion
Morris
Riley
Shawnee
Wabaunsee

Sturgeon, Pallid
Scaphirhynchus albus
Atchison
Doniphan
Douglas
Wyandotte

Insect

Beetle, American Burying
Nicrophorus americanus
Doniphan
Douglas
Montgomery
Riley

Mammal

Bat, Gray
Myotis grisescens
Bourbon
Cherokee
Crawford
Labette

Ferret, Black-footed
Mustela nigripes
Ford
Sedgwick

Monocot

Orchid, Western Prairie Fringed
Platanthera praeclara
Anderson
Atchison
Crawford
Douglas
Franklin
Jackson
Jefferson
Lyon
Osage
Riley
Shawnee

Kentucky

Bird

Plover, Piping
Charadrius melodus
Jefferson

Tern, Interior (population) Least
Sterna antillarum
Ballard
Fulton
Hickman
Jefferson
McCracken

Bird

Warbler (=Wood), Kirtland's
Dendroica kirtlandii
Warren

Warbler, Bachman's
Vermivora bachmanii
Logan
Warren

Woodpecker, Ivory-billed
Campephilus principalis
Ballard
Fulton
Lincoln

Woodpecker, Red-cockaded
Picoides borealis
Laurel
Pulaski
Wayne

Bivalve

Fanshell
Cyprogenia stegaria
Allen
Bath
Fleming
Henderson
Jefferson
Nicholas
Owen
Pendleton
Spencer
Todd
Warren
Wayne
Wayne

Mucket, Pink (Pearlymussel)
Lampsilis abrupta
Ballard
Bath
Boone
Henderson
Jefferson
Marshall
McCracken
Pendleton
Pulaski
Spencer

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Bivalve

Warren
Wayne

Mussel, Clubshell
Pleurobema clava
Allen
Bath
Grayson
Jefferson
Marshall
Owen
Pendleton
Pulaski
Spencer
Warren

Mussel, Cumberland Combshell
Epioblasma brevidens
Laurel
Pulaski
Wayne

Mussel, Cumberland Elktoe
Alasmidonta atropurpurea
Laurel

Mussel, Oyster
Epioblasma capsaeformis
Laurel
Pulaski
Wayne

Mussel, Ring Pink (=Golf Stick
Obovaria retusa
Ballard
Boone
Henderson
Jefferson
Marshall
McCracken
Pulaski
Todd
Warren
Wayne

Mussel, Rough Pigtoe
Pleurobema plenum
Marshall
Pendleton
Pulaski

Bivalve

Warren
Wayne

Mussel, Winged Mapleleaf
Quadrula fragosa
Oldham
Pendleton

Pearlymussel, Appalachian
Quadrula sparsa
Pulaski

Pearlymussel, Cracking
Hemistena lata
Jefferson
Pulaski
Wayne

Pearlymussel, Cumberland Bean
Villosa trabalis
Jackson
Laurel
Lincoln
Pulaski
Wayne

Pearlymussel, Dromedary
Dromus dromas
Pulaski
Wayne

Pearlymussel, Fat Pocketbook
Potamilus capax
Crittenden
Henderson
Jefferson
Marshall
McCracken
Warren

Pearlymussel, Little-wing
Pegias fabula
Jackson
Laurel
Logan
Pulaski
Todd
Wayne

Pearlymussel, Orange-footed
Plethobasus cooperianus
Ballard

Bivalve

Crittenden
Grayson
Hancock
Jefferson
Marshall
McCracken
Warren
Wayne

Pearlymussel, Purple Cat's Paw
Epioblasma obliquata obliquata
Henderson
Pulaski
Warren

Pearlymussel, Tubercled-blossom
Epioblasma torulosa torulosa
Henderson
McCracken
Pendleton
Warren

Pearlymussel, White Wartyback
Plethobasus cicatricosus
Henderson
Marshall
Todd

Pearlymussel, Yellow-blossom
Epioblasma florentina florentina
Pulaski
Todd

Riffleshell, Northern
Epioblasma torulosa rangiana
Bath
Grayson
Pendleton
Spencer
Warren

Riffleshell, Tan
Epioblasma florentina walkeri (=E. walkeri)
Laurel
Logan
Pulaski
Wayne

Dicot

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Dicot

Clover, Running Buffalo
Trifolium stoloniferum
Boone
Bourbon
Fayette
Jefferson
Goldenrod, Short's
Solidago shortii
Fleming
Jefferson

Nicholas
Potato-bean, Price's
Apios priceana

Warren
Rock-cress, Large (=Braun's)
Arabis perstellata E. L. Braun var. ampla Rollins

Owen

Rock-cress, Small
Arabis perstellata E. L. Braun var. perstellata Fernald

Owen

Spiraea, Virginia

Spiraea virginiana
Laurel

Pulaski

Fish

Dace, Blackside
Phoxinus cumberlandensis
Knox
Laurel
Pulaski

Darter, Bluemask (=jewel)
Etheostoma /
Hickman

Darter, Relict
Etheostoma chienense
Graves
Hickman

Shiner, Palezone
Notropis albizonatus
Wayne

Sturgeon, Pallid

Fish

Ballard
Fulton
Hickman

Insect

Beetle, American Burying
Nicrophorus americanus
Henderson
Jefferson

Mammal

Bat, Gray
Myotis grisescens
Allen

Caldwell
Christian
Crittenden

Fayette

Graves

Grayson

Hardin

Hopkins

Jefferson

Logan

Pulaski
Todd

Warren
Wayne

Bat, Indiana
Myotis sodalis
Allen
Anderson
Ballard
Bath

Boone
Bourbon
Caldwell

Christian
Clay
Crittenden
Daviess

Fayette
Fleming
Fulton

Mammal

Hancock
Hardin
Henderson
Hickman
Hopkins
Jackson
Jefferson
Knox
Laurel
Lincoln

Logan
Marshall
McCracken

Nicholas
Oldham
Owen

Pendleton

Pulaski

Shelby

Spencer

Todd

Warren

Wayne

Bat, Virginia Big-eared
Corynorhinus (=Plecotus) townsendii virginianus
Jackson

Louisiana

Bird

Pelican, Brown
Pelecanus occidentalis
Cameron
Cameron
Iberia
Jefferson
LaFourche

Orleans
Plaquemines
St. Mary
St. Tammany

Tangipahoa
Terrebonne
Vermilion

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Bird

Cameron
Iberia
Jefferson
LaFourche
Plaquemines
St. Mary
Terrebonne
Vermilion

Tern, California Least
Sterna antillarum browni
Madison

Tern, Interior (population) Least
Sterna antillarum
Bossier
Caddo
Concordia
East Carroll
Red River
Tensas

Woodpecker, Red-cockaded
Picoides borealis
Beauregard
Bossier
Calcasieu
De Soto
Evangeline
Grant
Jackson
La Salle
Livingston
Morehouse
Natchitoches
Ouachita
Rapides
Red River
St. Tammany
Tangipahoa
Webster
Winn

Bivalve

Mucket, Pink (Pearlymussel)
Lampsilis abrupta
Morehouse

Bivalve

Mussel, Heelsplitter Inflated
Potamilus inflatus
Ascension
East Baton Rouge
Livingston

Pearlshell, Louisiana
Margaritifera hembeli
Grant
Rapides

Dicot

Fruit, Earth (=geocarpon)
Geocarpon minimum
Winn

Ferns

Quillwort, Louisiana
Isoetes louisianensis
St. Tammany
Washington

Fish

Sturgeon, Gulf
Acipenser oxyrinchus desotoi
Ascension
Cameron
East Baton Rouge
Iberia
Iberville
Jefferson
LaFourche
Livingston
Orleans
Plaquemines
St. Mary
St. Tammany
Tangipahoa
Terrebonne
Vermilion
Washington

Sturgeon, Pallid
Scaphirhynchus albus
Ascension
Avoyelles
Bossier

Fish

Caldwell
Catahoula
Concordia
East Baton Rouge
East Carroll
Franklin
Grant
Iberia
Iberville
Jefferson
Madison
Morehouse
Natchitoches
Orleans
Ouachita
Plaquemines
Pointe Coupee
Rapides
Red River
Richland
Richland
St. Landry
St. Martin
St. Mary
Tensas
West Baton Rouge
West Carroll
West Feliciana
Winn

Mammal

Bear, Louisiana Black
Ursus americanus luteolus
Avoyelles
Catahoula
Concordia
East Carroll
Franklin
Grant
Iberia
Iberville
Madison
Pointe Coupee
Richland
St. Landry

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Mammal

St. Mary
St. Tammany
Tensas
Vermilion
Washington
West Carroll
West Feliciana

Marine mml

Manatee, West Indian
Trichechus manatus
Ascension
Cameron
East Baton Rouge
Jefferson
LaFourche
Livingston
Orleans
Plaquemines
St. Tammany
Tangipahoa
Terrebonne

Reptile

Sea turtle, green
Chelonia mydas
Cameron
Jefferson
LaFourche
Plaquemines
St. Mary
Terrebonne
Vermilion

Sea turtle, hawksbill
Eretmochelys imbricata
Cameron
Iberia
Jefferson
LaFourche
Plaquemines
St. Mary
Terrebonne
Vermilion

Reptile

Iberia
Jefferson
LaFourche
Plaquemines
St. Mary
Terrebonne
Vermilion

Sea turtle, leatherback
Dermochelys coriacea
Cameron
Iberia
Jefferson
LaFourche
Plaquemines
St. Mary
Terrebonne
Vermilion

Sea turtle, loggerhead
Caretta caretta
Cameron
Iberia
Jefferson
LaFourche
Plaquemines
St. Mary
Terrebonne
Vermilion

Tortoise, Gopher
Gopherus polyphemus
St. Tammany
Tangipahoa
Washington

Turtle, Ringed Sawback
Graptemys oculifera
St. Tammany
Washington

Maine

Bird

Plover, Piping
Charadrius melodus

Bird

Tern, Roseate
Sterna dougallii dougallii
Sagadahoc
York

Fish

Sturgeon, Shortnose
Acipenser brevirostrum
Sagadahoc

Monocot

Monocot

Pogonia, Small Whorled
Isotria medeoloides
Oxford
York

Maryland

Dicot

Harperella
Ptilimnium nodosum
Allegany

Fish

Darter, Maryland
Etheostoma sellare
Harford

Sturgeon, Shortnose
Acipenser brevirostrum
Harford

Insect

Beetle, Northeastern Beach Tiger
Cicindela dorsalis dorsalis
Cicindela dorsalis dorsalis
Calvert

Beetle, Puritan Tiger
Cicindela puritana
Calvert

Mammal

Mammal

Bat, Indiana
Myotis sodalis
Allegany
Frederick
Harford
Howard

	Sagadahoc	Montgomery
Sea turtle, Kemp's ridley	York	Reptile
Lepidochelys kempii		Reptile
Cameron		

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Reptile

Turtle, Bog (Northern population)
Clemmys muhlenbergii
Harford

Massachusetts

Bird

Plover, Piping
Charadrius melodus

Barnstable
Bristol

Starling, Ponape Mountain

Aplonis pelzelni
Worcester

Tern, Roseate
Sterna dougallii dougallii

Barnstable
Bristol

Dicot

Gerardia, Sandplain
Agalinis acuta

Water
Barnstable

Fish

Sturgeon, Shortnose
Acipenser brevirostrum
Bristol
Franklin

Monocot

Bulrush, Northeastern (=Barbed
Scirpus ancistrochaetus
Franklin

Pogonia, Small Whorled

Isotria medeoloides
Worcester

Michigan

Bird

Plover, Piping

Charadrius melodus

Charlevoix

Leelanau

Mason

Bird

Oscoda

Bivalve

Mussel, Clubshell
Pleurobema clava
Hillsdale

Dicot

Goldenrod, Houghton's
Solidago houghtonii

Charlevoix

Monkey-flower, Michigan

Mimulus glabratus var.

Charlevoix
Leelanau

Thistle, Pitcher's
Cirsium pitcheri

Alcona
Charlevoix
Leelanau
Mason

Ottawa

Van Buren

Insect

Butterfly, Karner Blue
Lycaeides melissa samuelis
Mason
Newaygo

Butterfly, Mitchell's Satyr
Neonympha mitchellii mitchellii
Branch
Jackson
Van Buren

Mammal

Bat, Indiana
Myotis sodalis

Branch
Clinton

Eaton

Genesee

Gratiot

Hillsdale

Mammal

Livingston
Mason
Ottawa
Shiawassee
Tuscola
Van Buren

Monocot

Iris, Dwarf Lake
Iris lacustris
Iris lacustris
Charlevoix

Orchid, Eastern Prairie Fringed
Orchid, Eastern Prairie Fringed
Platanthera leucophaea
Platanthera leucophaea
Clinton
Eaton

Genesee
Gratiot
Gratiot
Livingston
Tuscola

Reptile

Snake, Northern Copperbelly

Nerodia erythrogaster neglecta
Branch
Eaton
Hillsdale

Minnesota

Bivalve

Bivalve

Pearlymussel, Higgins' Eye
Lampsilis higginsii
Wabasha

Dicot

Clover, Prairie Bush
Lespedeza leptostachya

Jackson
Mower
Renville

Rice

Roseroot, Leedy's
Roseroot, Leedy's
Sedum integrifolium ssp. leedyi

Fillmore

Mammal

Warbler (=Wood), Kirtland's

Dendroica kirtlandii

Alcona

Ingham

Jackson

Leelanau

Mammal

Wolf, Gray

Wolf, Gray

Canis lupus

Canis lupus

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Mammal

Otter Tail
Todd

Monocot

Lily, Minnesota Trout
Erythronium propullans
Rice

Orchid, Western Prairie Fringed
Platanthera praeclara
Fillmore
Mower

Mississippi

Amphibian

Frog, Dusky Gopher (Mississippi
Rana capito sevosa
Harrison

Bird

Crane, Mississippi Sandhill
Grus canadensis pulla

Jackson

Pelican, Brown
Pelecanus occidentalis

Hancock
Harrison

Jackson

Plover, Piping
Charadrius melodus

Hancock
Harrison

Jackson

Tern, Interior (population) Least
Sterna antillarum

Bolivar

Coahoma
De Soto
Issaquena
Tunica

Warren
Washington
Woodpecker, Red-cockaded
Picoides borealis
Amite
Forrest
Franklin

Bird

George
Greene
Harrison
Jackson
Jasper
Jones
Noxubee

Oktibbeha
Perry
Scott
Smith
Stone

Wayne
Wilkinson
Winston
Yalobusha

Bivalve

Combshell, Southern (=Penitent mussel)
Epioblasma penita

Itawamba

Lowndes

Monroe
Mucket, Orangenacre
Lampsilis perovalis

Itawamba

Lowndes

Monroe
Mussel, Alabama Moccasinshell
Medionidus acutissimus

Lowndes

Monroe

Mussel, Black (=Curtus' Mussel) Clubshell
Pleurobema curtum
Itawamba
Monroe

Mussel, Heavy Pigtoe (=Judge Tait's Mussel)
Pleurobema taitianum
Itawamba
Lowndes
Monroe
Mussel, Heelsplitter Inflated
Potamilus inflatus

Bivalve

Hancock
Pearl River
Mussel, Ovate Clubshell
Pleurobema perovatum
Itawamba
Lowndes
Monroe
Monroe
Mussel, Southern Clubshell
Pleurobema decisum
Clay
Itawamba
Itawamba
Lowndes
Monroe
Pearlymussel, Fat Pocketbook
Potamilus capax
Jefferson

Dicot

Pondberry
Lindera melissifolia

Bolivar
Sharkey
Sharkey

Sunflower
Tallahatchie
Potato-bean, Price's

Apios priceana
Chickasaw
Chickasaw

Clay
Kemper
Oktibbeha

Ferns

Quillwort, Louisiana
Quillwort, Louisiana
Isoetes louisianensis
Forrest
Forrest
George
Greene
Hancock
Harrison
Harrison
Jackson
Jones
Pearl River
Perry
Stone
Wayne

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Fish

Darter, Bayou
Etheostoma rubrum
Claiborne
Copiah
Hinds
Sturgeon, Gulf
Acipenser oxyrinchus desotoi

Clarke
Copiah
Forrest
George
Greene
Hancock
Harrison
Hinds
Jackson
Jones
Lawrence
Lincoln
Madison
Marion
Pearl River
Perry
Pike
Rankin
Simpson
Stone
Walthall
Wayne
Sturgeon, Pallid
Scaphirhynchus albus
Adams
Bolivar
Claiborne
Coahoma
De Soto
Issaquena
Jefferson
Jefferson Davis
Sharkey
Tunica
Warren
Washington
Wilkinson

Fish

Yazoo

Mammal

Bat, Gray
Myotis grisescens
Perry
Wayne

Bear, Louisiana Black
Ursus americanus luteolus
Adams
Amite
Attala
Claiborne
Clarke
Copiah
Forrest
Franklin
George
Greene
Hancock
Harrison
Hinds
Holmes
Humphreys
Issaquena
Jackson
Jasper
Jefferson
Jefferson Davis
Jones
Lamar
Lauderdale
Lawrence
Lowndes
Madison
Marion
Neshoba
Newton
Pearl River
Perry
Pike
Rankin
Scott
Sharkey
Simpson

Mammal

Smith
Stone
Tunica
Warren
Washington
Wayne
Wilkinson

Yazoo

Reptile

Sea turtle, green
Chelonia mydas
Hancock
Harrison
Sea turtle, Kemp's ridley
Lepidochelys kempii
Hancock
Harrison
Jackson
Sea turtle, loggerhead
Caretta caretta
Hancock
Harrison
Jackson
Snake, Eastern Indigo
Drymarchon corais couperi
Forrest
George
Greene
Harrison
Jackson
Jones
Marion
Perry
Stone
Wayne
Tortoise, Gopher
Gopherus polyphemus
Forrest
George
Greene
Hancock
Harrison
Jackson
Jones

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Reptile

Lamar
Marion
Pearl River
Perry
Stone
Wayne

Turtle, Ringed Sawback
Graptemys oculifera
Copiah
Hinds
Lawrence
Madison
Marion
Neshoba
Pearl River
Rankin
Scott
Simpson

Turtle, Yellow-blotched Map
Graptemys flavimaculata
Clarke
Forrest
George
Greene
Jackson
Jones
Perry
Stone
Wayne

Missouri

Bird

Plover, Piping
Charadrius melodus
Buchanan
Polk

Tern, Interior (population) Least
Sterna antillarum

Chariton

Perry

Bivalve

Mucket, Pink (Pearlymussel)
Lampsilis abrupta

Butler

Bivalve

Cedar
Cole
Franklin
Gasconade
Jefferson
Miller
Osage
St. Clair
St. Louis
Wayne

Mussel, Scaleshell
Leptodea leptodon
Crawford
Franklin
Gasconade
Jefferson
La clede
Osage
Pulaski
St. Louis
Wright

Mussel, Winged Mapleleaf
Quadrula fragosa
Franklin

Pearlymussel, Curtis'
Epioblasma florentina curtisii
Bollinger
Butler
Wayne

Pearlymussel, Fat Pocketbook
Potamilus capax
Dunklin
Lewis
Pike

Crustacean

Crayfish, Cave (Cambarus
Cambarus aculabrum

Benton

Dicot

Aster, Decurrent False
Boltonia decurrens
Dunklin

Franklin

Howell

Dicot

Pike
St. Charles

Bladderpod, Missouri
Lesquerella filiformis
Christian
Dade
Greene
Lawrence

Clover, Running Buffalo
Trifolium stoloniferum
Barry
Benton
Boone
Callaway
Carter
Cedar
Christian
Cole
Crawford
Dade
Dent
Dunklin
Howard
La clede
Madison
Moniteau
Ozark
Phelps
St. Charles
St. Louis
Texas
Vernon
Wayne

Fruit, Earth (=geocarpon)
Geocarpon minimum
Cedar

Dade
Greene
Greene
Henry
Henry
Lawrence
Polk

St. Clair

Milkweed, Mead's
Milkweed, Mead's
Asclepias meadii

Dicot

Adair
Barton
Benton
Cass
Cedar
Dade
Harrison
Henry
Iron
Pettis
Polk
Reynolds
St. Clair
Vernon

Pondberry
Lindera melissifolia
Butler

Sneezeweed, Virginia
Helenium virginicum
Howell
Shannon

Fish

Cavefish, Ozark
Amblyopsis rosae
Barry
Benton
Christian
Greene
Jasper
Lawrence
Newton
Stone

Chub, Humpback
Gila cypha
Caldwell

Darter, Niangua
Etheostoma nianguae
Benton
Bollinger
Camden
Cedar
Dallas
Greene
Lewis

Fish

Miller
Osage
Pike
Polk
St. Clair
Webster

Madtom, Neosho
Noturus placidus
Jasper

Shiner, Topeka
Notropis topeka (=tristis)
Boone
Callaway
Cooper
Daviess
Grundy
Harrison
Howard
Moniteau
Pettis

Sturgeon, Gulf
Acipenser oxyrinchus desotoi
Cedar

Sturgeon, Pallid
Scaphirhynchus albus
Boone
Buchanan
Callaway
Carroll
Chariton
Clay
Cole
Cooper
Franklin
Gasconade
Howard
Jefferson
Lafayette
Lewis
Livingston
Moniteau
Montgomery
Osage
Perry

Fish

Ray
Saline
St. Charles
St. Louis
Ste. Genevieve
Warren

Insect

Beetle, American Burying
Nicrophorus americanus
Bollinger
Boone
Franklin
Howard
Jefferson
Newton
St. Louis
Wayne

Dragonfly, Hine's Emerald
Somatochlora hineana
Dent
Iron
Phelps
Reynolds
Shannon
Wayne

Mammal

Bat, Gray
Myotis grisescens
Barry
Benton
Boone
Camden
Carter
Christian
Cole
Crawford
Dade
Dallas
Dent
Douglas
Franklin
Greene
Iron
Jasper

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Mammal

Jefferson
La clede
Lawrence
McDonald
Miller
Morgan
Newton
Oregon
Osage
Ozark
Phelps
Pike
Pulaski
Reynolds
Shannon

St. Clair
St. Louis
Stone

Texas
Washington
Wright

Bat, Indiana
Myotis sodalis

Adair
Audrain
Barry
Boone
Buchanan
Caldwell
Callaway
Camden
Carroll

Chariton
Christian
Clay
Clinton
Cooper
Crawford
Daviess
De Kalb
Franklin
Gentry
Grundy
Harrison

Mammal

Henry
Howard
Iron
Jefferson
La clede
Lewis
Linn
Livingston
Macon
Montgomery
Oregon
Phelps
Pike
Pulaski
Randolph

Ray
Schuyler
Scotland

Shannon
St. Charles
St. Francois
St. Louis
Stone

Texas
Warren
Washington
Wright

Monocot

Orchid, Western Prairie Fringed
Platanthera praeclara
Harrison

Montana

Dicot

Howellia, Water
Howellia aquatilis
Missoula

Fish

Sturgeon, Pallid
Scaphirhynchus albus
Custer

Trout, Bull
Salvelinus confluentus
Missoula

Fish

Ravalli

Trout, Bull (Columbia River
Salvelinus confluentus
Missoula
Ravalli

Trout, Bull (Klamath River
Salvelinus confluentus
Missoula
Ravalli

Mammal

Bear, Grizzly
Ursus arctos horribilis
Carbon
Missoula

Ferret, Black-footed
Mustela nigripes
Custer

Wolf, Gray
Canis lupus
Carbon
Missoula

Nebraska

Bird

Crane, Whooping
Grus americana
Brown
Holt

Plover, Piping
Charadrius melodus
Brown
Cass
Cass
Holt
Sarpy

Tern, Interior (population) Least
Sterna antillarum
Brown
Cass
Holt
Sarpy

Fish

Sturgeon, Pallid
Scaphirhynchus albus
Cass

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Fish

Nemaha
Otoe
Richardson
Sarpy

Insect

Beetle, Salt Creek Tiger
Cicindela nevadica lincolniana
Lancaster

Monocot

Orchid, Western Prairie Fringed
Platanthera praeclara

Lancaster

Nevada

Bird

Flycatcher, Southwestern Willow
Empidonax traillii extimus

Clark

Rail, Yuma Clapper
Rallus longirostris yumanensis

Clark

Dicot

Blazing Star, Ash Meadows

Mentzelia leucophylla
Nye

Centaury, Spring-loving
Centaurium namophilum
Nye

Gumplant, Ash Meadows
Grindelia fraxino-pratensis
Nye

Ivesia, Ash Meadows
Ivesia kingii var. eremica
Nye

Milk-vetch, Ash Meadows
Astragalus phoenix
Nye

Niterwort, Amargosa
Nitrophila mohavensis
Nye

Fish

Chub, Bonytail
Gila elegans
Clark

Chub, Pahranagat Roundtail
Gila robusta jordani
Lincoln

Chub, Virgin River
Gila seminuda (=robusta)
Clark

Dace, Ash Meadows Speckled
Rhinichthys osculus nevadensis

Nye

Dace, Moapa
Moapa coriacea
Clark

Poolfish, Pahrump (= Pahrump
Empetrichthys latos

Clark

Nye
Pupfish, Ash Meadows Amargosa

Cyprinodon nevadensis mionectes

Nye

Pupfish, Devils Hole

Cyprinodon diabolis
Clark

Nye

Pupfish, Warm Springs
Cyprinodon nevadensis pectoralis
Nye

Spinedace, Big Spring
Lepidomeda mollispinis pratensis

Lincoln

Spinedace, White River
Lepidomeda albivallis
Nye

Springfish, Hiko White River
Crenichthys baileyi grandis

Lincoln

Springfish, Railroad Valley
Crenichthys nevadae
Nye

Fish

Sucker, Razorback
Xyrauchen texanus
Clark

Trout, Lahontan Cutthroat
Oncorhynchus clarki henshawi
Nye

Woundfin
Plagopterus argentissimus
Clark

Insect

Naucorid, Ash Meadows
Ambrysus amargosus
Nye

Monocot

Ladies'-tresses, Ute
Spiranthes diluvialis

Lincoln

Reptile

Tortoise, Desert
Gopherus agassizii

Clark

Lincoln

Nye

New Hampshire

Monocot
Monocot

Pogonia, Small Whorled
Isotria medeoloides
Rockingham
Rockingham

New Jersey

Dicot

Joint-vetch, Sensitive
Aeschynomene virginica
Cumberland
Cumberland

Fish

Sturgeon, Shortnose
Acipenser brevirostrum
Acipenser brevirostrum
Cumberland
Hunterdon
Mercer

Sunray, Ash Meadows
Enceliopsis nudicaulis var. corrugata
Nye

Springfish, White River
Crenichthys baileyi baileyi
Lincoln

Mercer
Mammal

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Mammal

Bat, Indiana
Myotis sodalis
Hunterdon
Mercer
Middlesex

Monocot

Pink, Swamp
Helonias bullata
Cumberland
Middlesex

Reptile

Turtle, Bog (Northern population)

Clemmys muhlenbergii
Hunterdon

New Mexico

Amphibian

Frog, Chiricahua Leopard
Rana chiricahuensis
Hidalgo
Luna
Sierra

Bird

Crane, Whooping

Grus americana

Bernalillo

Quay

Rio Arriba

Sandoval
Sierra

Taos

Valencia

Falcon, Northern Aplomado
Falco femoralis septentrionalis

Chaves

Dona Ana

Eddy

Hidalgo

Lea

Bird

Flycatcher, Southwestern Willow
Empidonax traillii extimus
Bernalillo
Colfax
Dona Ana
Hidalgo
Luna
Otero
Rio Arriba
Sandoval
Sierra
Taos

Valencia

Owl, Mexican Spotted
Strix occidentalis lucida
Bernalillo
Chaves
Colfax

Dona Ana
Eddy
Hidalgo
Lincoln

Otero
Rio Arriba

Sandoval

Sierra

Taos

Torrance

Valencia

Plover, Piping
Charadrius melodus

Colfax

Tern, Interior (population) Least
Sterna antillarum

Chaves

Curry

De Baca

Dona Ana

Eddy

Crustacean

Amphipod, Noel's
Gammarus desperatus
Chaves

Dicot

Cactus, Kuenzler Hedgehog
Echinocereus fendleri var.
Chaves
Eddy
Lincoln
Otero

Cactus, Lee Pincushion
Coryphantha sneedii var. leei

Eddy
Eddy

Cactus, Sneed Pincushion
Coryphantha sneedii var. sneedii
Dona Ana
Eddy

Pennyroyal, Todsen's
Pennyroyal, Todsen's
Hedeoma todsenii
Otero
Sierra

Poppy, Sacramento Prickly
Argemone pleiacantha ssp. pinnatisecta

Otero

Sunflower, Pecos
Sunflower, Pecos
Helianthus paradoxus

Chaves

Valencia

Thistle, Sacramento Mountains
Cirsium vinaceum

Otero

Wild-buckwheat, Gypsum
Eriogonum gypsophilum

Eddy

Fish

Fish

Gambusia, Pecos
Gambusia, Pecos
Gambusia nobilis
Gambusia nobilis
Chaves
Chaves

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Lincoln	Otero	Eddy
Luna	Quay	Eddy
Otero	Rio Arriba	Minnow, Loach
Sierra		Minnow, Loach
		Tiaroga cobitis
		Tiaroga cobitis

Crustacean

Hidalgo

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Fish

Minnow, Rio Grande Silvery
Hybognathus amarus
Bernalillo
Dona Ana
Rio Arriba
Sandoval
Sierra
Valencia

Shiner, Arkansas River
Notropis girardi
Colfax
Quay

Shiner, Beautiful
Cyprinella formosa

Luna

Shiner, Pecos Bluntnose
Notropis simus pecosensis
Chaves
De Baca
Eddy

Spikedace
Meda fulgida
Hidalgo

Trout, Gila
Oncorhynchus gilae
Sierra

Gastropod

Snail, Pecos Assiminea
Assiminea pecos
Chaves

Springsnail, Koster's
Juturnia kosteri
Chaves

Springsnail, Roswell
Pyrgulopsis roswellensis

Chaves

Mammal

Bat, Lesser (=Sanborn's) Long-

Leptonycteris curasoae
Hidalgo

Bat, Mexican Long-nosed
Leptonycteris nivalis
Hidalgo

Mammal

Ferret, Black-footed
Mustela nigripes
Bernalillo
Chaves
Colfax
Curry
De Baca
Dona Ana
Eddy
Hidalgo
Lea
Lincoln
Luna
Otero

Quay
Rio Arriba
Roosevelt
Sandoval
Sierra
Taos
Torrance
Valencia

Jaguar
Panthera onca
Hidalgo

Wolf, Gray
Canis lupus
Hidalgo

Luna

Reptile

Rattlesnake, New Mexican Ridge-
Crotalus willardi obscurus
Hidalgo

New York

Ferns

Fern, American hart's-tongue
Asplenium scolopendrium var. americanum

Onondaga

Mammal

Bat, Indiana
Myotis sodalis
Allegany

Mammal

Cattaraugus
Chautauqua
Cortland
Erie
Franklin
Onondaga
Orleans
Schoharie
St. Lawrence

Monocot

Pogonia, Small Whorled
Isotria medeoloides
Onondaga

North Carolina

Bird

Plover, Piping
Charadrius melodus
Brunswick
Carteret
Currituck
Hyde
New Hanover
Onslow
Pamlico

Stork, Wood
Mycteria americana
Brunswick

Tern, Roseate
Sterna dougallii dougallii
Carteret

Woodpecker, Red-cockaded
Picoides borealis
Beaufort

Bladen
Brunswick
Brunswick
Carteret
Chatham

Columbus
Craven
Cumberland
Currituck
Edgecombe
Franklin

Bird

Greene
Halifax
Harnett
Hoke
Hyde
Johnston
Lee
Lenoir
Moore
Nash
New Hanover
Onslow
Orange
Pamlico
Pasquotank
Pitt
Richmond
Sampson
Scotland
Stanly

Tyrrell
Union
Wake
Washington
Wayne
Wilson

Bivalve

Mussel, Dwarf Wedge
Alasmidonta heterodon
Franklin
Granville
Halifax
Johnston
Nash
Orange
Wake
Wilson

Mussel, Heelsplitter Carolina
Lasmigona decorata
Cabarrus
Richmond
Union

Mussel, Oyster
Epioblasma capsaeformis

Bivalve

Madison

Pearlymussel, Little-wing
Pegias fabula
Chowan

Purple Bean
Villosa perpurpurea
Chowan

Spinymussel, James River
Pleurobema collina
Rockingham

Spinymussel, Tar River
Elliptio steinstansana
Edgecombe
Franklin
Halifax
Johnston
Nash
Pitt

Dicot

Amaranth, Seabeach
Amaranthus pumilus
Brunswick
Carteret
Currituck
Hyde
New Hanover
Onslow

Avens, Spreading
Geum radiatum
Burke

Bittercress, Small-anthered
Cardamine micranthera
Edgecombe
Stokes

Blazing Star, Heller's
Liatris helleri
Burke

Chaffseed, American
Schwalbea americana
Bladen
Cumberland
Hoke
Moore
Scotland

Dicot

Coneflower, Smooth
Echinacea laevigata
Durham
Granville
Orange
Rockingham

Dropwort, Canby's
Oxypolis canbyi
Scotland

Harperella
Ptilimnium nodosum
Chatham
Granville
Lee

Heartleaf, Dwarf-flowered
Hexastylis naniflora
Burke
Catawba
Lincoln
Polk
Polk

Heather, Mountain Golden
Hudsonia montana
Burke

Joint-vetch, Sensitive
Aeschynomene virginica
Beaufort
Craven
Hyde
Lenoir

Loosestrife, Rough-leaved
Lysimachia asperulaefolia
Beaufort
Bladen
Brunswick
Carteret
Columbus
Cumberland
Harnett
Hoke
Moore
New Hanover
Onslow
Pamlico
Richmond

US EPA ARCHIVE DOCUMENT

Dicot

Scotland
Meadowrue, Cooley's
Thalictrum cooleyi
Brunswick
Columbus
New Hanover
Onslow
Pondberry
Lindera melissifolia
Bladen
Cumberland
Sampson
Spiraea, Virginia
Spiraea virginiana
Tyrrell
Sumac, Michaux's
Rhus michauxii
Cumberland
Davie
Durham
Franklin
Hoke
Johnston
Lincoln
Moore
Orange
Richmond

Scotland
Wake
Wilson
Sunflower, Schweinitz's
Helianthus schweinitzii
Cabarrus

Davidson
Rowan
Stanly

Stokes
Surry

Union

Fish

Chub, Spotfin
Erimonax monachus
Madison

Fish

Shiner, Cape Fear
Notropis mekistocholas
Chatham
Harnett
Lee
Moore
Silverside, Waccamaw
Menidia extensa
Columbus
Sturgeon, Shortnose
Acipenser brevirostrum
Bladen
Brunswick
Carteret
Chowan
Columbus
Craven
Currituck
Hyde
New Hanover
Onslow
Pamlico
Pasquotank
Richmond
Tyrrell
Washington

Insect

Butterfly, Saint Francis' Satyr
Neonympha mitchellii francisci
Cumberland
Hoke

Mammal

Bat, Gray
Myotis grisescens
Madison

Bat, Indiana
Myotis sodalis

Alexander

Chowan
Polk
Squirrel, Carolina Northern Flying
Glaucomys sabrinus coloratus
Madison

Marine mml

Manatee, West Indian
Trichechus manatus
Beaufort
Brunswick
Carteret
Craven
Currituck
Hyde
New Hanover
Onslow
Pamlico
Pitt

Monocot

Irisette, White
Sisyrinchium dichotomum
Polk
Pogonia, Small Whorled
Isotria medeoloides
Burke
Chowan
Polk
Surry
Sedge, Golden
Carex lutea
Onslow

Reptile

Sea turtle, green
Chelonia mydas
Brunswick
Carteret
Hyde
New Hanover
Onslow
Onslow
Sea turtle, hawksbill
Eretmochelys imbricata

Carteret
Hyde

Sea turtle, Kemp's ridley
Sea turtle, Kemp's ridley
Lepidochelys kempii
Beaufort
Brunswick
Carteret
Hyde
Pamlico

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Reptile

Sea turtle, leatherback
Dermochelys coriacea
Brunswick
Carteret
Craven
Currituck
Hyde
Onslow

Sea turtle, loggerhead
Caretta caretta

Water
Beaufort
Brunswick

Carteret
Chowan

Craven

Currituck
Hyde

New Hanover

Onslow

Pamlico
Pasquotank
Tyrrell

Washington

Ohio

Bird

Plover, Piping

Charadrius melodus

Ashtabula

Lucas

Bivalve

Fanshell
Cyprogenia stegaria

Meigs

Washington

Mucket, Pink (Pearlymussel)
Lampsilis abrupta

Bivalve

Tuscarawas

Dicot

Clover, Running Buffalo
Trifolium stoloniferum
Hamilton

Spiraea, Virginia
Spiraea virginiana
Scioto

Insect

Beetle, American Burying

Nicrophorus americanus

Vinton

Butterfly, Karner Blue
Lycaeides melissa samuelis

Lucas

Dragonfly, Hine's Emerald
Somatochlora hineana

Lucas

Mammal

Bat, Indiana
Myotis sodalis

Allen

Ashland
Ashtabula
Brown

Darke

Delaware

Fairfield

Geauga

Guernsey
Hamilton

Hardin

Highland

Huron

Licking

Logan

Mammal

Washington

Monocot

Orchid, Eastern Prairie Fringed
Platanthera leucophaea
Lucas

Pogonia, Small Whorled
Isotria medeoloides
Scioto

Reptile

Snake, Northern Copperbelly

Nerodia erythrogaster neglecta

Hardin

Oklahoma

Bird

Bird

Crane, Whooping
Crane, Whooping
Grus americana
Beckham
Beckham
Blaine
Blaine
Caddo
Canadian

Carter

Cleveland

Comanche
Cotton
Custer

Garfield

Garvin

Grady

Grant
Greer

Harmon

Jackson

Jefferson

Johnston

Kingfisher

Meigs

Washington

Mussel, Clubshell
Pleurobema clava

Ashtabula

Delaware

Fairfield

Lucas

Meigs

Paulding

Putnam

Scioto

Tuscarawas

Vinton

Lincoln

Logan

Love

Major

Marshall

McClain

Murray

Muskogee

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Bird

Noble
Oklahoma
Osage
Pawnee
Payne
Rogers
Stephens
Texas
Tillman
Wagoner
Washington
Washita

Curlew, Eskimo
Numenius borealis
Osage

Plover, Piping
Charadrius melodus
Atoka
Blaine
Bryan
Caddo
Canadian
Carter
Cherokee
Choctaw
Cleveland
Comanche
Cotton
Creek
Custer
Delaware
Garfield
Grady
Grant
Harmon
Haskell
Hughes
Jackson
Jefferson
Johnston
Kay
Kingfisher
Le Flore
Lincoln

Bird

Logan
Love
Major
Marshall
Mayes
McClain
McCurtain
McIntosh
Muskogee
Noble
Nowata
Oklahoma
Osage
Ottawa
Pawnee
Payne
Pittsburg
Pontotoc
Pottawatomie
Pushmataha
Rogers
Seminole
Sequoyah
Texas
Tillman
Tulsa
Wagoner
Washington

Tern, Interior (population) Least
Sterna antillarum
Blaine
Bryan
Canadian
Choctaw
Cleveland
Comanche
Cotton
Creek
Custer
Grady
Harmon
Haskell
Hughes
Jackson

Bird

Jefferson
Johnston
Kay
Kingfisher
Le Flore
Logan
Love
Major
Marshall
McClain
McCurtain
McIntosh
Murray
Muskogee
Noble
Oklahoma
Osage
Pawnee
Payne
Pittsburg
Pontotoc
Pottawatomie
Rogers
Seminole
Sequoyah
Texas
Tillman
Tulsa
Wagoner

Vireo, Black-capped
Vireo atricapilla
Blaine
Caddo
Canadian
Cleveland
Comanche

Woodpecker, Red-cockaded
Picoides borealis
Bryan
Le Flore
McCurtain
Pittsburg
Pushmataha

Bivalve

Bivalve

Mussel, Scaleshell
Leptodea leptodon

Choctaw
Le Flore
McCurtain
Pushmataha

Rock-pocketbook, Ouachita
(=Wheeler's pm)

Arkansia wheeleri

Le Flore

McCurtain

Pushmataha

Fish

Cavefish, Ozark
Amblyopsis rosae
Craig
Delaware
Mayes
Ottawa
Darter, Leopard
Percina pantherina

Le Flore

McCurtain

Pushmataha

Madtom, Neosho
Noturus placidus
Craig

Ottawa

Shiner, Arkansas River
Notropis girardi

Blaine

Caddo

Canadian

Cleveland

Custer

Grady

Hughes

Fish

Seminole
Texas

Insect

Beetle, American Burying
Nicrophorus americanus
Atoka

Bryan

Cherokee

Choctaw

Coal

Haskell

Le Flore
McCurtain
Muskogee
Pittsburg
Pushmataha
Sequoyah
Tulsa

Mammal

Bat, Gray
Myotis grisescens

Adair

Cherokee

Delaware
Ottawa

Bat, Indiana
Myotis sodalis

Adair
Cherokee

Craig

Delaware

Haskell

Le Flore

Mayes

McCurtain

McIntosh

Muskogee

Mammal

Bat, Ozark Big-eared
Corynorhinus (=Plecotus) townsendii ingens

Adair
Cherokee
Delaware
Ottawa

Sequoyah

Monocot

Orchid, Eastern Prairie Fringed
Orchid, Eastern Prairie Fringed
Platanthera leucophaea
Platanthera leucophaea
Choctaw
Choctaw
Orchid, Western Prairie Fringed
Platanthera praeclara
Craig
Rogers

Oregon

Bird

Bird

Murrelet, Marbled
Brachyramphus marmoratus marmoratus

Baker

Curry

Douglas
Lane

Lincoln
Polk

Owl, Northern Spotted
Strix occidentalis caurina

Benton

Clackamas

Columbia

Coos

Curry

Douglas

Hood River

Jackson

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Major

McClain

McIntosh

Oklahoma

Pittsburg

Pontotoc

Pottawatomie

Ottawa

Pittsburg

Pushmataha

Sequoyah

Wagoner

Josephine

Lane

Lincoln

Linn

Marion

Multnomah

Polk

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Bird

Washington
Yamhill
Fall
Pelican, Brown
Pelecanus occidentalis
Coos
Curry
Lane
Lincoln
Plover, Western Snowy
Charadrius alexandrinus nivosus
Coos

Curry
Douglas
Lane
Lincoln

Crustacean

Fairy Shrimp, Vernal Pool
Branchinecta lynchi
Jackson

Dicot

Catchfly, Spalding's
Silene spaldingii
Columbia
Wallowa

Checker-mallow, Nelson's
Sidalcea nelsoniana
Benton
Clackamas
Linn
Marion
Polk
Willamette

Washington

Yamhill

Daisy, Willamette
Erigeron decumbens var.

Benton

Lane

Linn
Marion

Polk
Four-o'clock, Macfarlane's
Mirabilis macfarlanei
Wallowa
Lomatium, Bradshaw's

Dicot

Benton
Lane

Linn
Marion
Polk
Lomatium, Cook's
Lomatium cookii
Jackson
Josephine
Lupine, Kincaid's
Lupinus sulphureus (=oreganus) ssp. kincaidii (=var. kincaidii)

Benton
Douglas
Lane
Linn
Polk
Yamhill

Meadowfoam, Large-flowered Woolly
Limnanthes floccosa ssp.
Jackson
Popcornflower, Rough
Plagiobothrys hirtus

Douglas

Thelypody, Howell's Spectacular
Thelypodium howellii spectabilis
Baker
Union

Fish

Chub, Oregon

Oregonichthys crameri

Benton

Clackamas
Lane

Linn

Marion

Polk

Salmon, Chinook (Lower Columbia River)
Oncorhynchus (=Salmo)
Clackamas
Columbia
Hood River
Multnomah

Fish

Washington
Salmon, Chinook (Snake River Run)
Oncorhynchus (=Salmo)
Columbia
Hood River
Morrow
Multnomah
Umatilla
Union
Wallowa
Salmon, Chinook (Snake River
Salmon, Chinook (Snake River spring/summer)
Oncorhynchus (=Salmo)
Baker
Columbia
Hood River
Morrow
Multnomah

Umatilla
Union
Wallowa
Salmon, Chinook (Upper River Spring)
Oncorhynchus (=Salmo)
Columbia
Columbia
Hood River
Morrow
Multnomah
Umatilla
Salmon, Chinook (Upper River)
Oncorhynchus (=Salmo)
Oncorhynchus (=Salmo)
Benton
Benton
Clackamas
Columbia
Columbia
Douglas
Douglas
Lane
Lane
Linn
Linn
Marion
Multnomah
Polk
Washington
Yamhill

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Fish

Salmon, Chum (Columbia River population)
Oncorhynchus (=Salmo) keta
Columbia
Multnomah
Washington

Salmon, Coho (Southern OR/Northern CA Coast)
Oncorhynchus (=Salmo) kisutch

Curry
Douglas
Jackson
Josephine

Salmon, Sockeye (Snake River population)
Oncorhynchus (=Salmo) nerka

Columbia

Hood River
Morrow
Multnomah
Umatilla
Wallowa

Steelhead, (Lower Columbia River population)
Oncorhynchus (=Salmo) mykiss
Clackamas
Columbia
Hood River
Marion

Multnomah

Washington

Steelhead, (Middle Columbia River population)
Oncorhynchus (=Salmo) mykiss
Columbia
Hood River
Morrow
Multnomah
Umatilla
Union
Wallowa
Wheeler

Steelhead, (Snake River Basin population)
Oncorhynchus (=Salmo) mykiss
Baker

Fish

Columbia
Hood River
Morrow
Multnomah
Umatilla
Union
Wallowa

Steelhead, (Upper Columbia River population)
Oncorhynchus (=Salmo) mykiss
Columbia
Hood River
Morrow

Multnomah

Umatilla

Steelhead, (Upper Willamette River population)
Oncorhynchus (=Salmo) mykiss
Benton
Clackamas
Columbia
Lane
Linn

Marion
Multnomah
Polk
Washington
Yamhill

Trout, Bull
Salvelinus confluentus

Baker

Clackamas
Columbia
Hood River
Lane
Linn
Malheur
Morrow
Multnomah
Polk
Umatilla
Union
Wallowa
Wheeler
Yamhill

Fish

Trout, Bull (Columbia River
Salvelinus confluentus
Baker
Columbia
Hood River
Lane
Linn

Malheur
Morrow
Morrow
Multnomah
Umatilla
Union
Wallowa
Wheeler
Wheeler

Trout, Bull (Klamath River
Salvelinus confluentus

Baker
Columbia
Hood River
Lane
Linn
Malheur
Morrow
Morrow
Multnomah
Umatilla
Union
Wallowa
Wheeler

Insect

Butterfly, Fender's Blue
Icaricia icarioides fenderi
Icaricia icarioides fenderi
Benton
Lane
Polk
Yamhill

Butterfly, Oregon Silverspot
Speyeria zerene hippolyta
Lane
Lincoln
Yamhill

Mammal

Deer, Columbian White-tailed
Odocoileus virginianus leucurus
Columbia

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Mammal

Douglas

Multnomah

Monocot

Fritillary, Gentner's
Fritillaria gentneri

Jackson
Josephine

Lily, Western
Lilium occidentale

Coos

Pennsylvania

Mammal

Bat, Indiana
Myotis sodalis

Bedford
Berks
Blair
Clearfield
Dauphin
Delaware
Greene
Lackawanna
Lancaster
Lebanon
Lehigh
Pike
Susquehanna

Washington
Wyoming
York

Monocot

Bulrush, Northeastern (=Barbed
Scirpus ancistrochaetus

Dauphin
Lackawanna

Reptile

Turtle, Bog (Northern population)
Clemmys muhlenbergii

Berks
Lancaster
Lebanon
Lehigh
York

South Carolina

Amphibian

Salamander, Flatwoods
Ambystoma cingulatum

Beaufort

Berkeley
Charleston
Orangeburg

Bird

Plover, Piping
Charadrius melodus

Beaufort
Charleston
Colleton
Georgetown
Horry

Stork, Wood
Mycteria americana

Aiken
Allendale
Bamberg
Barnwell
Beaufort
Berkeley
Charleston
Colleton
Dorchester
Georgetown

Hampton
Horry
Lexington
Marion
Williamsburg

Warbler, Bachman's
Vermivora bachmanii

Charleston

Woodpecker, Red-cockaded
Picoides borealis

Aiken

Allendale
Bamberg
Barnwell
Beaufort
Berkeley

Bird

Calhoun
Calhoun
Charleston
Chesterfield

Clarendon
Colleton
Darlington
Darlington
Dillon
Dorchester
Edgefield
Edgefield
Florence
Georgetown
Hampton
Horry
Kershaw
Laurens
Lee
Lexington
Marion
Marlboro
McCormick
Orangeburg
Pickens
Richland
Saluda
Sumter
Williamsburg

Bivalve

Mussel, Heelsplitter Carolina
Lasmigona decorata

Chesterfield
Edgefield
Greenwood
Kershaw
Kershaw
Lancaster
McCormick
McCormick

Dicot

Amaranth, Seabeach
Amaranth, Seabeach
Amaranthus pumilus

Charleston

Georgetown
Horry

Amphianthus, Little
Amphianthus pusillus

Lancaster

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Dicot

Saluda
York

Chaffseed, American
Schwalbea americana
Barnwell
Beaufort
Berkeley
Charleston

Clarendon
Florence
Georgetown
Horry
Lee
Sumter

Williamsburg
Coneflower, Smooth

Echinacea laevigata
Aiken
Allendale
Anderson
Barnwell
Lancaster
Lexington
Oconee
Pickens
Richland
Dropwort, Canby's

Oxypolis canbyi
Allendale
Bamberg
Barnwell
Beaufort
Berkeley
Charleston
Clarendon

Colleton
Dorchester
Georgetown

Hampton
Horry
Lee
Marlboro

Orangeburg
Pickens

Dicot

Richland
Sumter

Williamsburg
Gooseberry, Miccosukee
Ribes echinellum
Edgefield
McCormick
Harperella

Ptilimnium nodosum
Aiken
Barnwell
Saluda
Heartleaf, Dwarf-flowered
Hexastylis naniflora

Greenville
Spartanburg

York
Loosestrife, Rough-leaved
Lysimachia asperulaefolia
Chesterfield
Darlington
Greenwood
Horry
Kershaw
Marlboro
Pickens
Richland

Pitcher-plant, Mountain Sweet
Sarracenia rubra ssp. jonesii
Greenville
Pondberry
Lindera melissifolia
Barnwell
Beaufort
Berkeley

Charleston
Colleton
Dorchester

Georgetown
Horry
Sunflower, Schweinitz's
Helianthus schweinitzii

Horry
Lancaster

Dicot

Lexington
York

Ferns

Quillwort, Black-spored
Isoetes melanospora
Lancaster

Fish

Sturgeon, Shortnose
Acipenser brevirostrum
Aiken
Allendale
Barnwell
Beaufort

Berkeley
Calhoun

Charleston
Clarendon
Colleton
Darlington
Dillon
Dorchester
Florence
Georgetown
Hampton
Horry
Marion

Marlboro
Orangeburg
Pickens
Richland
Sumter
Williamsburg

Lichen

Lichen, Rock Gnome
Gymnoderma lineare

Greenville

Mammal

Bat, Indiana
Myotis sodalis
Oconee

Marine mml

Manatee, West Indian
Trichechus manatus

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Marine mml

Beaufort
Berkeley
Charleston
Georgetown
Horry

Whale, Finback
Balaenoptera physalus
Beaufort
Charleston
Georgetown
Horry

Whale, Humpback
Megaptera novaeangliae
Beaufort
Charleston
Georgetown
Horry

Monocot

Arrowhead, Bunched

Sagittaria fasciculata
Greenville

Irisette, White

Sisyrinchium dichotomum
Greenville

Pink, Swamp
Helonias bullata
Greenville

Pogonia, Small Whorled
Isotria medeoloides
Greenville

Oconee

Trillium, Persistent
Trillium persistens

Oconee

Trillium, Relict
Trillium reliquum
Aiken
Edgefield

Reptile

Sea turtle, green
Chelonia mydas

Charleston

Colleton
Georgetown

Reptile

Horry

Sea turtle, Kemp's ridley
Lepidochelys kempii
Beaufort
Charleston
Colleton
Georgetown
Horry

Sea turtle, leatherback
Dermochelys coriacea
Beaufort
Charleston
Colleton
Georgetown
Horry

Sea turtle, loggerhead
Caretta caretta
Beaufort
Berkeley

Charleston
Colleton
Georgetown

Horry

Snake, Eastern Indigo
Drymarchon corais couperi

Hampton

South Dakota

Bird

Crane, Whooping
Grus americana

Lawrence

Mammal

Ferret, Black-footed
Mustela nigripes

Lawrence

Tennessee

Bird

Stork, Wood
Mycteria americana

Shelby

Tern, Interior (population) Least
Sterna antillarum

Bird

Lake
Shelby
Tipton

Woodpecker, Red-cockaded
Picoides borealis
Chester
McNairy
Morgan

Bivalve

Mucket, Pink (Pearlymussel)
Lampsilis abrupta
Montgomery

Mussel, Cumberland Elktoe
Alasmidonta atropurpurea
Morgan

Mussel, Rough Pigtoe
Pleurobema plenum
Montgomery

Pearlymussel, Alabama Lamp
Lampsilis virescens
Morgan

Pearlymussel, Dromedary
Dromus dromas
Montgomery

Pearlymussel, Orange-footed
Plethobasus cooperianus
Montgomery

Pearlymussel, Tubercled-blossom
Epioblasma torulosa torulosa
Washington

Pearlymussel, Turgid-blossom
Pearlymussel, Turgid-blossom
Epioblasma turgidula

Shelby

Pearlymussel, Yellow-blossom
Epioblasma florentina florentina
Epioblasma florentina florentina
Rutherford

Purple Bean
Villosa perpurpurea
Morgan

Riffleshell, Tan
Epioblasma florentina walkeri (=E. walkeri)

Montgomery
Rutherford

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Dicot

Clover, Leafy Prairie
Dalea foliosa
Rutherford
Coneflower, Tennessee Purple
Echinacea tennesseensis
Rutherford
Ground-plum, Guthrie's
Astragalus bibullatus
Rutherford
Potato-bean, Price's

Apios priceana
Montgomery
Rock-cress, Large (=Braun's)
Arabis perstellata E. L. Braun var. ampla Rollins

Rutherford
Rosemary, Cumberland
Conradina verticillata

Morgan

Sandwort, Cumberland
Arenaria cumberlandensis
Morgan
Spiraea, Virginia
Spiraea virginiana
Morgan

Fish

Chub, Spotfin
Erimonax monachus
Cave
Morgan
Sturgeon, Pallid
Scaphirhynchus albus
Lake
Shelby
Tipton

Mammal

Bat, Gray
Myotis grisescens

Montgomery
Overton
Rutherford

Bat, Indiana
Myotis sodalis
Chester
Coffee

Mammal

Henry
Lake
Madison
Montgomery
Morgan
Obion
Overton
Rutherford
Shelby
Tipton

Washington
Weakley

Monocot

Pogonia, Small Whorled
Pogonia, Small Whorled
Isotria medeoloides
Washington

Texas

Amphibian

Salamander, Barton Springs
Eurycea sosorum
Hays
Travis
Salamander, San Marcos
Eurycea nana

Bexar
Comal
Hays

Medina
Uvalde
Salamander, Texas Blind
Typhlomolge rathbuni
Bexar
Comal

Hays
Medina

Uvalde

Toad, Houston
Bufo houstonensis
Austin

Bastrop

Burleson
Colorado
Fort Bend

Amphibian

Freestone
Harris
Harrison
Lavaca
Lee
Leon
Milam
Robertson

Arachnid

Harvestman, Bee Creek Cave
Texella reddelli
Burnet
Travis
Williamson
Williamson
Harvestman, Bone Cave
Texella reyesi
Travis
Travis
Williamson

Harvestman, Robber Baron Cave
Texella cokendolpheri
Bexar
Meshweaver, Braken Bat Cave
Cicurina venii
Bexar

Pseudoscorpion, Tooth Cave
Tartarocreagris texana
Travis
Spider, Government Canyon

Neoleptoneta microps
Bexar
Spider, Madla's Cave
Cicurina madla
Bexar

Spider, Robber Baron Cave
Cicurina baronia
Bexar
Bexar

Spider, Tooth Cave
Neoleptoneta myopica
Travis

Spider, Vesper Cave
Cicurina vespera
Cicurina vespera
Bexar

Bird

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Bird

Crane, Whooping
Grus americana
- Angelina
- Aransas
- Archer
- Armstrong
- Austin
- Bastrop
- Baylor
- Bee
- Bell
- Bexar
- Blanco
- Bosque
- Brazoria
- Brazos
- Brewster
- Brown
- Burleson
- Burnet
- Caldwell
- Callahan
- Clay
- Coleman
- Collin
- Collingsworth
- Colorado
- Comanche
- Cooke
- Coryell
- Crosby
- De Witt
- Denton
- Donley
- Eastland
- Ellis
- Erath
- Falls
- Fayette
- Fort Bend
- Garza
- Gillespie
- Goliad
- Gonzales

Bird

- Gray
- Guadalupe
- Hamilton
- Hardeman
- Harrison
- Haskell
- Hays
- Hill
- Hood
- Howard
- Jack
- Jackson
- Johnson
- Jones
- Karnes
- Knox
- Lamar
- Lampasas
- Lavaca
- Lee
- Limestone
- Llano
- Lubbock
- Lynn
- Mason
- Matagorda
- Maverick
- Midland
- Milam
- Mills
- Montague
- Palo Pinto
- Parker
- Randall
- Refugio
- Robertson
- San Patricio
- San Saba
- Somervell
- Sterling
- Tarrant
- Terry
- Throckmorton
- Travis

Bird

- Victoria
- Washington
- Wharton
- Wheeler
- Wichita
- Williamson
- Wilson
- Wise
- Young

Curlew, Eskimo
Numenius borealis
- Aransas
- Chambers
- Galveston

Falcon, Northern Aplomado
Falco femoralis septentrionalis
- Brewster
- Brooks
- Cameron
- Culberson
- Dimmit
- Ector
- El Paso
- Frio
- Hidalgo
- Hudspeth
- Jeff Davis
- Maverick
- Midland
- Nueces
- Pecos
- Presidio
- Reeves
- San Patricio
- Val Verde
- Ward
- Webb
- Winkler

Flycatcher, Southwestern Willow
Empidonax traillii extimus
- Brewster
- Culberson
- El Paso
- Hudspeth

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Bird

Jeff Davis
Presidio
Owl, Mexican Spotted
Strix occidentalis lucida
Culberson
El Paso
Hudspeth
Jeff Davis
Pelican, Brown
Pelecanus occidentalis
Aransas
Brazoria
Cameron
Chambers
Galveston
Jackson
Jefferson
Matagorda
Nueces
Refugio
San Patricio
Victoria
Plover, Piping
Charadrius melodus
Angelina
Aransas
Brazoria
Cameron
Chambers
Dallas
Delta
Denton
Galveston
Grayson
Jefferson
Matagorda
Nueces
Refugio
San Patricio
Tarrant
Throckmorton
Prairie-chicken, Attwater's Greater
Tympanuchus cupido attwateri
Aransas

Bird

Austin
Colorado
Galveston
Goliad
Refugio
Victoria
Washington
Tern, Interior (population) Least
Sterna antillarum
Bowie
Briscoe
Clay
Collingsworth
Cooke
Dallas
Delta
Denton
Donley
El Paso
Fannin
Freestone
Gray
Grayson
Gregg
Hardeman
Hemphill
Jeff Davis
Lamar
Leon
Limestone
Milam
Montague
Rains
Randall
Red River
Robertson
Tarrant
Throckmorton
Tom Green
Val Verde
Webb
Wheeler
Wichita

Bird

Vireo, Black-capped
Vireo atricapilla
Bandera
Bell
Bexar
Blanco
Bosque
Brewster
Brown
Burnet
Callahan
Coke
Coleman
Comal
Comanche
Concho
Cooke
Coryell
Crockett
Dallas
Eastland
Edwards
Erath
Gillespie
Grayson
Hamilton
Hays
Hill
Hood
Irion
Jack
Jeff Davis
Johnson
Kendall
Kerr
Kimble
Lampasas
Llano
Maverick
McCulloch
McLennan
Medina
Menard
Midland

Bird

Mills
Montague

pecki

Nolan
Palo Pinto
Parker
Pecos
Reagan
Real
Runnels
San Saba
Schleicher
Shackelford
Somervell
Stephens
Sutton
Taylor
Tom Green
Travis
Upton
Uvalde

Val Verde
Williamson
Wise

Warbler (=Wood), Golden-cheeked
Dendroica chrysoparia

Bandera
Bell
Bexar

Blanco
Bosque
Burnet

Hedgehog

Comal
Comanche
Coryell
Dallas
Eastland
Edwards
Erath
Gillespie
Hamilton
Hays
Hill
Hood
Johnson

Bird

Kendall
Kerr

Kimble
Lampasas
Llano
Mason
McLennan
Medina
Menard
Palo Pinto
Real
San Saba
Somervell
Stephens
Travis
Uvalde
Williamson
Young

Woodpecker, Red-cockaded
Picoides borealis

Anderson
Angelina
Bowie

Cass
Cherokee
Hardin
Harrison
Hood

Houston
Jasper
Liberty

Marion
Montgomery
Nacogdoches
Newton
Panola
Polk
Red River
Sabine
San Augustine
San Jacinto
Trinity
Tyler
Walker

Crustacean

Amphipod, Peck's Cave
Stygobromus (=Stygonectes)

Bexar
Comal
Hays
Medina
Uvalde

Dicot

Ambrosia, South Texas
Ambrosia cheiranthifolia

Cameron
Hidalgo
Jim Wells
Nueces

Ayenia, Texas
Ayenia limitaris

Cameron
Hidalgo
Nueces

Bladderpod, White
Lesquerella pallida

San Augustine

Cactus, Black Lace
Echinocereus reichenbachii var.

Jim Wells
Refugio
Uvalde

Cactus, Bunched Cory
Coryphantha ramillosa

Brewster

Cactus, Chisos Mountain

Echinocereus chisoensis var. chisoensis

Brewster

Cactus, Lloyd's Mariposa
Echinomastus mariposensis

Brewster
Presidio

Cactus, Nellie Cory
Coryphantha minima

Brewster

Cactus, Sneed Pincushion
Coryphantha sneedii var. sneedii

Culberson

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Dicot

El Paso
Hudspeth
Cactus, Star
Astrophytum asterias
Cameron
Hidalgo
Cactus, Tobusch Fishhook
Ancistrocactus tobuschii
Bandera
Edwards
Kerr
Kimble
Real
Uvalde
Val Verde
Cat's-eye, Terlingua Creek
Cryptantha crassipes
Brewster
Dawn-flower, Texas Prairie (=Texas Bitterweed)
Hymenoxys texana

Fort Bend
Harris
Harrison
Dogweed, Ashy
Thymophylla tephroleuca

Webb
Frankenia, Johnston's
Frankenia johnstonii
Webb

Fruit, Earth (=geocarpon)
Geocarpon minimum

Anderson
Manioc, Walker's
Manihot walkerae

Hidalgo

Oak, Hinckley
Quercus hinckleyi

Brewster

Presidio

Phlox, Texas Trailing
Phlox nivalis ssp. texensis
Hardin

Polk

Dicot

Tyler
Pitaya, Davis' Green
Echinocereus viridiflorus var. davisii
Brewster
Poppy-mallow, Texas
Callirhoe scabriuscula
Coke
Mitchell
Runnels
Rush-pea, Slender
Hoffmannseggia tenella
Nueces
Sand-verbena, Large-fruited
Abronia macrocarpa
Freestone
Leon
Robertson
Snowbells, Texas
Styrax texanus
Bandera

Edwards
Kimble
Real
Uvalde
Val Verde

Sunflower, Pecos
Helianthus paradoxus
Pecos
Reeves

Wild-buckwheat, Gypsum
Eriogonum gypsophilum
Culberson

Fish

Darter, Fountain
Etheostoma fonticola

Bexar
Caldwell

Comal

Hays

Medina
Uvalde

Gambusia, Big Bend
Gambusia gaigei

Brewster

Fish

Gambusia, Clear Creek
Gambusia heterochir
Menard
Gambusia, Pecos
Gambusia nobilis
Jeff Davis
Pecos
Reeves
Gambusia, San Marcos
Gambusia georgei
Bexar
Comal
Hays
Medina
Uvalde
Minnow, Devils River
Dionda diaboli
Val Verde
Pupfish, Comanche Springs
Cyprinodon elegans

Jeff Davis
Reeves
Uvalde
Pupfish, Leon Springs
Cyprinodon bovinus

Pecos
Shiner, Arkansas River
Notropis girardi
Hemphill

Gastropod

Gastropod

Snail, Pecos Assiminea
Assiminea pecos
Pecos

Reeves

Insect

Insect

Beetle, American Burying
Beetle, American Burying
Nicrophorus americanus
Lamar
Lamar
Red River
Red River
Beetle, Coffin Cave Mold
Beetle, Coffin Cave Mold
Batrisodes texanus
Williamson

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Insect

Beetle, Comal Springs Dryopid
Stygoparnus comalensis
Bexar
Comal
Hays
Medina
Uvalde

Beetle, Comal Springs Riffle
Heterelmis comalensis
Bexar
Comal
Hays
Medina
Uvalde

Beetle, Helotes Mold
Batrisodes venyivi
Bexar

Beetle, Kretschmarr Cave Mold
Texamaurops reddelli
Travis

Beetle, Tooth Cave Ground
Rhadine persephone
Travis
Williamson

Rhadine exilis (ncn)
Rhadine exilis
Bexar

Rhadine infernalis (ncn)
Rhadine infernalis
Bexar

Mammal

Bat, Mexican Long-nosed
Leptonycteris nivalis
Brewster
Presidio

Bear, Louisiana Black
Ursus americanus luteolus
Anderson
Angelina
Aransas
Bowie
Burleson
Cass
Cherokee

Mammal

Delta
Fannin
Gregg
Harrison
Jasper
Lamar
Lavaca
Leon
Marion
Morris
Nacogdoches
Newton
Panola
Refugio
Robertson
Rusk
Sabine
San Augustine
Smith
Upshur
Victoria
Washington

Jaguarundi, Gulf Coast
Herpailurus (=Felis) yagouaroundi cacomitli
Aransas
Atascosa
Bee
Brooks
Cameron
Dimmit
Frio
Hidalgo
Jim Hogg
Jim Wells
Karnes
La Salle
Live Oak
Maverick
Nueces
Refugio
San Patricio
Webb
Zavala

Mammal

Jaguarundi, Sinaloan
Herpailurus (=Felis) yagouaroundi tolteca
Aransas
Brooks
Cameron
Hidalgo
Jim Wells
Live Oak
Nueces
San Patricio

Ocelot
Leopardus (=Felis) pardalis
Aransas
Atascosa
Bee
Brooks
Cameron
Dimmit
Frio
Hidalgo
Jim Hogg
Jim Wells
Karnes
La Salle
Live Oak
Live Oak
Maverick
Maverick
Nueces
Refugio
San Patricio
Webb
Zavala

Monocot

Ladies'-tresses, Navasota
Ladies'-tresses, Navasota
Spiranthes parksii
Bastrop
Brazos
Burleson
Freestone
Grimes
Jasper
Leon
Madison
Milam

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Monocot

Robertson

Washington

Pondweed, Little Aguja Creek

Potamogeton clystocarpus

Jeff Davis

Wild-rice, Texas

Zizania texana

Bexar
Comal
Hays
Medina
Uvalde

Reptile

Sea turtle, green
Chelonia mydas

Aransas
Brazoria
Cameron
Chambers
Galveston
Jefferson
Matagorda
Nueces
Refugio

Sea turtle, hawksbill
Eretmochelys imbricata

Aransas
Brazoria
Cameron
Chambers
Galveston
Jefferson
Matagorda
Nueces
Refugio
San Patricio

Sea turtle, Kemp's ridley
Lepidochelys kempii

Aransas
Brazoria
Cameron
Chambers
Galveston
Jefferson

Reptile

Matagorda

Nueces
Refugio

San Patricio

Sea turtle, leatherback
Dermochelys coriacea

Aransas
Brazoria
Cameron
Chambers
Galveston
Jefferson
Matagorda
Nueces

Refugio
San Patricio

Sea turtle, loggerhead
Caretta caretta

Aransas
Brazoria
Cameron
Chambers
Galveston
Jefferson
Matagorda
Nueces
Refugio
San Patricio

Snake, Concho Water
Nerodia paucimaculata

Brown
Coke
Coleman
Concho
Irion
Lampasas
Maverick
McCulloch
Mills
Mitchell
Runnels
San Saba
Tom Green

Utah

Bird

Flycatcher, Southwestern Willow
Empidonax traillii extimus

Washington

Owl, Mexican Spotted
Strix occidentalis lucida

Kane
Washington
Wayne

Dicot

Bear-poppy, Dwarf
Arctomecon humilis

Washington

Bladderpod, Kodachrome
Lesquerella tumulosa

Kane

Cactus, Siler Pincushion
Pediocactus (=Echinocactus,=Utahia) sileri

Kane

Washington

Cactus, Uinta Basin Hookless
Sclerocactus glaucus

Duchesne

Cactus, Winkler
Cactus, Winkler
Pediocactus winkleri

Wayne

Cactus, Wright Fishhook
Sclerocactus wrightiae

Wayne

Cycladenia, Jones
Cycladenia jonesii (=humilis)

Kane

Daisy, Maguire
Erigeron maguirei

Wayne

Milk-vetch, Deseret
Astragalus desereticus

Utah

Milk-vetch, Holmgren
Astragalus holmgreniorum

Washington

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Dicot

Milk-vetch, Shivwits
Astragalus ampullarioides
Washington

Milkweed, Welsh's
Asclepias welshii
Kane

Phacelia, Clay
Phacelia argillacea
Utah

Reed-mustard, Barneby
Schoenocrambe barnebyi
Wayne

Reed-mustard, Shrubby
Schoenocrambe suffrutescens
Duchesne

Ridge-cress (=Pepper-cress),
Lepidium barnebyanum
Duchesne

Townsendia, Last Chance
Townsendia aprica
Wayne

Fish

Chub, Bonytail
Gila elegans
Kane
Wayne

Chub, Humpback
Gila cypha
Wayne

Chub, Virgin River
Gila seminuda (=robusta)
Washington

Squawfish, Colorado
Ptychocheilus lucius
Kane
Wayne

Sucker, June
Chasmistes liorus
Utah

Sucker, Razorback
Xyrauchen texanus
Kane
Wayne

Fish

Trout, Lahontan Cutthroat
Oncorhynchus clarki henshawi
Box Elder

Woundfin
Plagopterus argentissimus
Washington

Mammal

Ferret, Black-footed
Mustela nigripes
Duchesne

Prairie Dog, Utah
Cynomys parvidens
Washington
Wayne

Monocot

Ladies'-tresses, Ute
Spiranthes diluvialis
Duchesne
Salt Lake
Tooele
Utah
Wayne
Weber

Reptile

Tortoise, Desert
Gopherus agassizii
Washington

Vermont

Bivalve

Mussel, Dwarf Wedge
Alasmidonta heterodon
Windsor

Dicot

Milk-vetch, Jesup's
Astragalus robbinsii var. jesupi
Windsor

Mammal

Bat, Indiana
Myotis sodalis
Bennington
Chittenden
Windsor

Monocot

Bulrush, Northeastern (=Barbed
Scirpus ancistrochaetus
Windham

Virginia

Amphibian

Salamander, Shenandoah
Plethodon shenandoah
Madison
Rappahannock

Bird

Plover, Piping
Charadrius melodus
York

Woodpecker, Red-cockaded
Picoides borealis
Sussex

Bivalve

Mussel, Cumberland Combshell
Epioblasma brevidens
Epioblasma brevidens
Lee

Mussel, Dwarf Wedge
Alasmidonta heterodon
Culpeper
Cumberland
Fauquier
Franklin
Greensville
King George
King William
Louisa
Nottoway
Orange
Prince Edward
Prince William
Sussex

Mussel, Fine-rayed Pigtoe
Fusconaia cuneolus
Lee
Washington
Washington

Mussel, Oyster
Epioblasma capsaeformis
Epioblasma capsaeformis
Lee
Lee

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Bivalve

Mussel, Shiny Pigtoe
Fusconaia cor
Lee
Washington

Pearlymussel, Appalachian
Quadrula sparsa
Lee

Pearlymussel, Birdwing
Conradilla caelata
Lee
Washington

Pearlymussel, Cracking
Hemistena lata
Lee

Pearlymussel, Cumberland Bean
Villosa trabalis
Lee

Pearlymussel, Cumberland
Quadrula intermedia
Lee
Washington

Pearlymussel, Dromedary
Dromus dromas
Lee

Pearlymussel, Little-wing
Pegias fabula
Lee
Washington

Purple Bean
Villosa perpurpurea
Lee
Washington

Rabbitsfoot, Rough
Quadrula cylindrica strigillata
Lee
Washington

Riffleshell, Tan
Epioblasma florentina walkeri (=E. walkeri)
Washington

Spinymussel, James River
Pleurobema collina
Albemarle
Botetourt

Bivalve

Floyd
Franklin
Goochland
Nelson
Patrick
Pittsylvania

Crustacean

Isopod, Lee County Cave
Lirceus usdagalun
Lee

Isopod, Madison Cave
Antrolana lira
Augusta

Dicot

Bittercress, Small-anthered
Cardamine micranthera
Patrick

Chaffseed, American
Schwalbea americana
Greensville
Sussex

Coneflower, Smooth
Echinacea laevigata
Appomattox
Bedford
Botetourt
Floyd
Franklin
Mecklenburg
Montgomery
Nelson
Nottoway
Pittsylvania
Prince Edward
Pulaski

Harperella
Ptilimnium nodosum
Frederick
Frederick
Mecklenburg
Prince William

Joint-vetch, Sensitive
Aeschynomene virginica
Caroline
Charles City

Dicot

James City
King George
King William
Prince William

Rock-cress, Shale Barren
Arabis serotina
Augusta
Bath
Shenandoah

Sneezeweed, Virginia
Helenium virginicum
Augusta
Nelson

Spiraea, Virginia
Spiraea virginiana
Lee
Washington

Sumac, Michaux's
Rhus michauxii
Cumberland
Greensville
Mecklenburg
Nottoway
Prince Edward
Sussex

Sunflower, Schweinitz's
Helianthus schweinitzii
Patrick

Fish

Chub, Slender
Erimystax cahni
Lee

Chub, Spotfin
Erimonax monachus
Washington

Dace, Blackside
Phoxinus cumberlandensis
Lee
Lee

Logperch, Roanoke
Percina rex
Bedford
Bedford
Franklin
Greensville
Mecklenburg

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Fish

Montgomery
Nottoway
Patrick
Pittsylvania
Sussex

Madtom, Yellowfin
Noturus flavipinnis
Lee

Sturgeon, Shortnose
Acipenser brevirostrum
King George

Gastropod

Snail, Virginia Fringed Mountain
Polygyriscus virginianus
Pulaski

Insect

Beetle, Northeastern Beach Tiger
Cicindela dorsalis dorsalis
Northumberland
York

Butterfly, Mitchell's Satyr
Neonympha mitchellii mitchellii
Floyd
Franklin
Montgomery
Patrick
Pulaski

Mammal

Bat, Gray
Myotis grisescens
Lee
Washington

Bat, Indiana
Myotis sodalis
Albemarle
Augusta
Bath
Bedford
Botetourt
Fauquier
Floyd
Frederick
Lee

Mammal

Madison
Montgomery
Nelson
Pulaski
Rappahannock
Shenandoah
Washington

Bat, Virginia Big-eared
Corynorhinus (=Plecotus) townsendii virginianus
Augusta
Bath
Montgomery
Pulaski
Shenandoah

Squirrel, Virginia Northern Flying
Glaucomys sabrinus fuscus
Washington

Monocot

Bulrush, Northeastern (=Barbed
Scirpus ancistrochaetus
Augusta
Bath
Botetourt
Shenandoah

Orchid, Eastern Prairie Fringed
Platanthera leucophaea
Augusta

Pink, Swamp
Helonias bullata
Augusta
Caroline
Charles City
King William
Nelson

Pogonia, Small Whorled
Isotria medeoloides
Appomattox
Bedford
Botetourt
Buckingham
Caroline
Charles City
Franklin

Monocot

Gloucester
James City
King George
King William
Lee
Madison
Pittsylvania
Prince William
York

Reptile

Sea turtle, loggerhead
Caretta caretta
Gloucester
Northumberland
Virginia Beach
York

Washington

Bird

Murrelet, Marbled
Brachyramphus marmoratus marmoratus
Clallam
Clallam
Cowlitz
Cowlitz
Grays Harbor
Grays Harbor
Island
Kitsap
Kittitas
Kittitas
Lewis
Pierce
Skagit
Thurston
Whatcom

Owl, Northern Spotted
Strix occidentalis caurina
Chelan
Clallam
Clark
Cowlitz
Grays Harbor
Island
Kittitas
Lewis
Mason

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Bird

Okanogan
Pierce
Skagit
Thurston

Willamette
Whatcom
Yakima

Pelican, Brown
Pelecanus occidentalis
Clallam
Grays Harbor

Plover, Western Snowy
Charadrius alexandrinus nivosus
Grays Harbor

Dicot

Catchfly, Spalding's
Silene spaldingii

Lincoln

Spokane

Checker-mallow, Nelson's
Sidalcea nelsoniana

Cowlitz

Checker-mallow, Wenatchee
Sidalcea oregana var. calva
Chelan

Howellia, Water
Howellia aquatilis
Clark
Mason
Spokane
Thurston

Lupine, Kincaid's

Lupinus sulphureus (=oreganus) ssp. kincaidii (=var. kincaidii)
River

Lewis

Paintbrush, Golden
Castilleja levisecta

Island
San Juan

River
Thurston

Stickseed, Showy
Hackelia venusta
Chelan

Fish

Salmon, Chinook (Lower Columbia River)
Oncorhynchus (=Salmo)
Clark

Cowlitz
Lewis

Salmon, Chinook (Puget Sound)
Oncorhynchus (=Salmo)
Clallam
Grays Harbor
Island

Kitsap
Lewis
Mason
Pierce
San Juan

Skagit

Thurston

Whatcom

Salmon, Chinook (Snake River Fall Run)
Oncorhynchus (=Salmo)

Benton
Clark
Franklin

Walla Walla

Salmon, Chinook (Snake River spring/summer)
Oncorhynchus (=Salmo)
Benton
Clark
Cowlitz

Franklin
Walla Walla

Salmon, Chinook (Upper Columbia River Spring)
Oncorhynchus (=Salmo)

Benton
Chelan

Clark
Cowlitz

Douglas
Franklin

Fish

Okanogan
Walla Walla
Yakima

Salmon, Chinook (Upper

River)
Oncorhynchus (=Salmo)
Clark
Cowlitz

Salmon, Chum (Columbia River population)
Oncorhynchus (=Salmo) keta
Clark
Clark
Cowlitz
Lewis

Salmon, Chum (Hood Canal Summer population)
Oncorhynchus (=Salmo) keta
Clallam
Clallam
Island
Island
Kitsap
Kitsap
Mason

Salmon, Sockeye (Ozette Lake population)
Oncorhynchus (=Salmo) nerka
Clallam

Salmon, Sockeye (Snake River population)
Oncorhynchus (=Salmo) nerka
Benton
Clark
Cowlitz
Franklin

Walla Walla

Steelhead, (Lower Columbia

population)
Oncorhynchus (=Salmo) mykiss
Clark

Cowlitz
Lewis

Steelhead, (Middle Columbia

population)
Oncorhynchus (=Salmo) mykiss
Oncorhynchus (=Salmo) mykiss
Benton
Clark

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Fish

Kittitas
Walla Walla
Yakima

Steelhead, (Snake River Basin population)
Oncorhynchus (=Salmo) mykiss
Benton

Clark
Cowlitz
Franklin
Walla Walla

Steelhead, (Upper Columbia River population)
Oncorhynchus (=Salmo) mykiss
Benton
Chelan
Clark
Cowlitz
Douglas
Franklin
Grant
Kittitas
Okanogan
Walla Walla

Yakima

Steelhead, (Upper Willamette River population)
Oncorhynchus (=Salmo) mykiss
Clark
Cowlitz

Steelhead, Puget Sound
Oncorhynchus mykiss
Chelan
Clallam
Grays Harbor
Island
Kitsap
Kittitas
Lewis
Mason

Pierce
San Juan
Skagit
Thurston
Whatcom

Fish

Yakima

Trout, Bull
Salvelinus confluentus
Benton
Chelan
Clallam
Clark

Cowlitz
Franklin
Grant
Grays Harbor
Kittitas

Lewis
Lincoln
Mason
Okanogan
Pierce
Skagit
Spokane
Walla Walla
Whatcom
Yakima

Trout, Bull (Columbia River
Salvelinus confluentus

Benton

Chelan
Clark
Cowlitz
Douglas
Franklin
Grant
Kittitas
Okanogan
Walla Walla
Yakima

Trout, Bull (Klamath River
Salvelinus confluentus
Benton
Chelan

Clark
Cowlitz
Douglas
Franklin
Grant

Fish

Kittitas
Okanogan
Walla Walla
Yakima

Mammal

Bear, Grizzly
Bear, Grizzly
Ursus arctos horribilis
Chelan
Kittitas
Lewis
Okanogan
Pierce
Pierce
Skagit
Whatcom
Yakima

Deer, Columbian White-tailed
Odocoileus virginianus leucurus
Clark
Cowlitz

Rabbit, Pygmy
Brachylagus idahoensis
Adams
Benton
Douglas
Douglas
Grant
Grant
Lincoln

Wolf, Gray
Canis lupus
Chelan
Clark
Cowlitz
Kittitas
Lewis
Okanogan
Pierce
Skagit
Whatcom
Yakima

West Virginia

Bivalve

Spinymussel, James River
Pleurobema collina
Monroe

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Dicot

Harperella
Ptilimnium nodosum

Jefferson

Mammal

Bat, Indiana
Myotis sodalis

Berkeley
Jefferson
Marion
Marshall
Monroe
Putnam

Monocot

Bulrush, Northeastern (=Barbed
Scirpus ancistrochaetus

Berkeley

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1125 Species Affected:

Inverse Name:	Taxa:	Co.	Status:
Abalone, White	Crustacean	19	Endangered
Abutilon eremitopetalum (ncn)	Dicot	2	Endangered
Abutilon sandwicense (ncn)	Dicot	1	Endangered
Achyranthes mutica (ncn)	Dicot	2	Endangered
Achyranthes splendens var. rotundata (ncn)	Dicot	1	Endangered
A'e (Zanthoxylum dipetalum var. tomentosum)	Dicot	2	Endangered
A'e (Zanthoxylum hawaiiense)	Dicot	6	Endangered
'Aiea (Nothocestrum breviflorum)	Dicot	2	Endangered
'Aiea (Nothocestrum peltatum)	Dicot	2	Endangered
'Akepa, Hawaii	Bird	2	Endangered
'Akepa, Maui	Bird	2	Endangered
'Akia Loa, Kauai (Hemignathus procerus)	Bird	2	Endangered
'Akia Pola'au (Hemignathus munroi)	Bird	2	Endangered
'Akoko (Chamaesyce celastroides var. kaenana)	Dicot	1	Endangered
'Akoko (Chamaesyce deppeana)	Dicot	1	Endangered
'Akoko (Chamaesyce herbstii)	Dicot	1	Endangered
'Akoko (Chamaesyce kuwaleana)	Dicot	1	Endangered
'Akoko (Chamaesyce rockii)	Dicot	1	Endangered
'Akoko (Chamaesyce skottsbergii var. skottsbe	Dicot	3	Endangered
'Akoko (Euphorbia haeleeleana)	Dicot	3	Endangered
Alani (Melicope adscendens)	Dicot	2	Endangered
Alani (Melicope balloui)	Dicot	2	Endangered
Alani (Melicope haupuensis)	Dicot	2	Endangered
Alani (Melicope knudsenii)	Dicot	4	Endangered
Alani (Melicope lydgatei)	Dicot	1	Endangered
Alani (Melicope mucronulata)	Dicot	2	Endangered
Alani (Melicope munroi)	Dicot	2	Endangered
Alani (Melicope ovalis)	Dicot	2	Endangered
Alani (Melicope pallida)	Dicot	2	Endangered
Alani (Melicope quadrangularis)	Dicot	2	Endangered
Alani (Melicope reflexa)	Dicot	2	Endangered
Alani (Melicope saint-johnii)	Dicot	1	Endangered
Alani (Melicope zahlbruckneri)	Dicot	2	Endangered
Albatross, Short-tailed	Bird	1	Endangered
Allocarya, Calistoga	Dicot	4	Endangered
Alopecurus, Sonoma	Monocot	6	Endangered
Alsinidendron obovatum (ncn)	Dicot	1	Endangered
Alsinidendron trinerve (ncn)	Dicot	1	Endangered
Alsinidendron viscosum (ncn)	Dicot	2	Endangered
Amaranthus brownii (ncn)	Dicot	1	Endangered
Ambersnail, Kanab	Gastropod	4	Endangered
Ambrosia, San Diego	Dicot	7	Endangered
Ambrosia, South Texas	Dicot	4	Endangered
Amphipod, Illinois Cave	Crustacean	1	Endangered
Amphipod, Kauai Cave	Crustacean	2	Endangered
Amphipod, Noel's	Crustacean	2	Endangered
Amphipod, Peck's Cave	Crustacean	6	Endangered
'Anaunau (Lepidium arbuscula)	Dicot	1	Endangered
'Anunu (Sicyos alba)	Dicot	2	Endangered
Arrowhead, Bunched	Monocot	1	Endangered
Asplenium fragile var. insulare (ncn)	Ferns	2	Endangered
Aster, Florida Golden	Dicot	3	Endangered
Aupaka (Isodendrion hosakae)	Dicot	2	Endangered

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Aupaka (Isodendrion laurifolium)	Dicot	3	Endangered
Avens, Spreading	Dicot	1	Endangered
'Awikiwiki (Canavalia molokaiensis)	Dicot	2	Endangered
'Awiwi (Centaurium sebaeoides)	Dicot	4	Endangered
'Awiwi (Hedyotis cookiana)	Dicot	4	Endangered
Ayenia, Texas	Dicot	3	Endangered
Barberry, Island	Dicot	5	Endangered
Barberry, Nevin's	Dicot	10	Endangered
Bat, Gray	Mammal	144	Endangered
Bat, Hawaiian Hoary	Mammal	7	Endangered
Bat, Indiana	Mammal	418	Endangered
Bat, Lesser (=Sanborn's) Long-nosed	Mammal	25	Endangered
Bat, Mexican Long-nosed	Mammal	4	Endangered
Bat, Ozark Big-eared	Mammal	10	Endangered
Bat, Virginia Big-eared	Mammal	7	Endangered
Beargrass, Britton's	Monocot	6	Endangered
Bear-poppy, Dwarf	Dicot	4	Endangered
Beauty, Harper's	Monocot	1	Endangered
Bedstraw, El Dorado	Dicot	3	Endangered
Bedstraw, Island	Dicot	5	Endangered
Beetle, American Burying	Insect	46	Endangered
Beetle, Coffin Cave Mold	Insect	1	Endangered
Beetle, Comal Springs Dryopid	Insect	6	Endangered
Beetle, Comal Springs Riffle	Insect	6	Endangered
Beetle, Helotes Mold	Insect	1	Endangered
Beetle, Kretschmarr Cave Mold	Insect	1	Endangered
Beetle, Mount Hermon June	Insect	1	Endangered
Beetle, Ohlone Tiger	Insect	1	Endangered
Beetle, Salt Creek Tiger	Insect	3	Endangered
Beetle, Tooth Cave Ground	Insect	2	Endangered
Bird's-beak, Palmate-bracted	Dicot	27	Endangered
Bird's-beak, Pennell's	Dicot	4	Endangered
Bird's-beak, salt marsh	Dicot	24	Endangered
Bird's-beak, Soft	Dicot	12	Endangered
Bittercress, Small-anthered	Dicot	3	Endangered
Bladderpod, Kodachrome	Dicot	1	Endangered
Bladderpod, San Bernardino Mountains	Dicot	4	Endangered
Bladderpod, White	Dicot	1	Endangered
Blazing Star, Scrub	Dicot	2	Endangered
Bluegrass, Hawaiian	Monocot	2	Endangered
Bluegrass, Mann's (Poa mannii)	Monocot	2	Endangered
Bluegrass, Napa	Monocot	4	Endangered
Bluegrass, San Bernardino	Monocot	7	Endangered
Blue-star, Kearney's	Dicot	2	Endangered
Bobwhite, Masked	Bird	2	Endangered
Bonamia menziesii (ncn)	Dicot	7	Endangered
Broom, San Clemente Island	Dicot	6	Endangered
Buckwheat, Cushenbury	Dicot	4	Endangered
Buckwheat, Ione (incl. Irish Hill)	Dicot	1	Endangered
Bulrush, Northeastern (=Barbed Bristle)	Monocot	10	Endangered
Bush-mallow, San Clemente Island	Dicot	6	Endangered
Bush-mallow, Santa Cruz Island	Dicot	5	Endangered
Butterfly, Behren's Silverspot	Insect	7	Endangered
Butterfly, Callippe Silverspot	Insect	4	Endangered
Butterfly, El Segundo Blue	Insect	6	Endangered
Butterfly, Fender's Blue	Insect	8	Endangered
Butterfly, Karner Blue	Insect	4	Endangered

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Butterfly, Lange's Metalmark	Insect	4	Endangered
Butterfly, Lotis Blue	Insect	3	Endangered
Butterfly, Mission Blue	Insect	3	Endangered
Butterfly, Mitchell's Satyr	Insect	9	Endangered
Butterfly, Myrtle's Silverspot	Insect	6	Endangered
Butterfly, Palos Verdes Blue	Insect	6	Endangered
Butterfly, Quino Checkerspot	Insect	7	Endangered
Butterfly, Saint Francis' Satyr	Insect	2	Endangered
Butterfly, San Bruno Elfin	Insect	1	Endangered
Butterfly, Schaus Swallowtail	Insect	2	Endangered
Butterfly, Smith's Blue	Insect	2	Endangered
Button-celery, San Diego	Dicot	7	Endangered
Cactus, Arizona Hedgehog	Dicot	8	Endangered
Cactus, Bakersfield	Dicot	5	Endangered
Cactus, Black Lace	Dicot	4	Endangered
Cactus, Kuenzler Hedgehog	Dicot	7	Endangered
Cactus, Nellie Cory	Dicot	1	Endangered
Cactus, Nichol's Turk's Head	Dicot	5	Endangered
Cactus, Pima Pineapple	Dicot	2	Endangered
Cactus, Sneed Pincushion	Dicot	8	Endangered
Cactus, Star	Dicot	2	Endangered
Cactus, Tobusch Fishhook	Dicot	9	Endangered
Cactus, Wright Fishhook	Dicot	1	Endangered
Campion, Fringed	Dicot	8	Endangered
Caribou, Woodland	Mammal	3	Endangered
Cat's-eye, Terlingua Creek	Dicot	1	Endangered
Cavefish, Alabama	Fish	1	Endangered
Ceanothus, Coyote	Dicot	4	Endangered
Ceanothus, Pine Hill	Dicot	3	Endangered
Chaffseed, American	Dicot	21	Endangered
Chamaesyce Halemanui (ncn)	Dicot	2	Endangered
Checker-mallow, Keck's	Dicot	10	Endangered
Checker-mallow, Kenwood Marsh	Dicot	4	Endangered
Checker-mallow, Pedate	Dicot	4	Endangered
Checker-mallow, Wenatchee Mountains	Dicot	3	Endangered
Chub, Bonytail	Fish	18	Endangered
Chub, Gila	Fish	17	Endangered
Chub, Humpback	Fish	7	Endangered
Chub, Mohave Tui	Fish	18	Endangered
Chub, Oregon	Fish	13	Endangered
Chub, Owens Tui	Fish	1	Endangered
Chub, Pahranagat Roundtail	Fish	1	Endangered
Chub, Virgin River	Fish	10	Endangered
Chub, Yaqui	Fish	4	Endangered
Cladonia, Florida Perforate	Lichen	5	Endangered
Clarkia, Pismo	Dicot	5	Endangered
Clarkia, Presidio	Dicot	3	Endangered
Clarkia, Vine Hill	Dicot	4	Endangered
Cliffrose, Arizona	Dicot	14	Endangered
Clover, Leafy Prairie	Dicot	10	Endangered
Clover, Monterey	Dicot	2	Endangered
Clover, Running Buffalo	Dicot	46	Endangered
Clover, Showy Indian	Dicot	6	Endangered
Combshell, Southern (=Penitent mussel)	Bivalve	5	Endangered
Combshell, Upland	Bivalve	6	Endangered
Condor, California	Bird	37	Endangered
Coneflower, Smooth	Dicot	27	Endangered

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Coneflower, Tennessee Purple	Dicot	1	Endangered
Coot, Hawaiian (=Alae keo keo)	Bird	7	Endangered
Coyote-thistle, Loch Lomond	Dicot	4	Endangered
Crane, Mississippi Sandhill	Bird	1	Endangered
Crane, Whooping	Bird	187	Endangered
Crayfish, Cave (Cambarus aculabrum)	Crustacean	3	Endangered
Crayfish, Cave (Cambarus zophonastes)	Crustacean	1	Endangered
Crayfish, Shasta	Crustacean	4	Endangered
Creeper, Hawaii	Bird	2	Endangered
Creeper, Molokai (Kakawahie)	Bird	2	Endangered
Creeper, Oahu (Alauwahio)	Bird	1	Endangered
Crow, Hawaiian ('Alala)	Bird	2	Endangered
Crownscale, San Jacinto Valley	Dicot	4	Endangered
Curlew, Eskimo	Bird	4	Endangered
Cyanea undulata (ncn)	Dicot	2	Endangered
Cypress, Santa Cruz	Conf/cycds	2	Endangered
Dace, Ash Meadows Speckled	Fish	4	Endangered
Dace, Moapa	Fish	2	Endangered
Daisy, Willamette	Dicot	10	Endangered
Darter, Amber	Fish	3	Endangered
Darter, Bluemask (=jewel)	Fish	1	Endangered
Darter, Etowah	Fish	4	Endangered
Darter, Fountain	Fish	8	Endangered
Darter, Maryland	Fish	1	Endangered
Darter, Okaloosa	Fish	2	Endangered
Darter, Relict	Fish	2	Endangered
Darter, Vermilion	Fish	1	Endangered
Darter, Watercress	Fish	1	Endangered
Dawn-flower, Texas Prairie (=Texas Bitterweed)	Dicot	4	Endangered
Deer, Columbian White-tailed	Mammal	7	Endangered
Delissea rhytodisperma (ncn)	Dicot	2	Endangered
Diellia erecta (ncn)	Ferns	5	Endangered
Diellia falcata (ncn)	Ferns	1	Endangered
Diellia pallida (ncn)	Ferns	2	Endangered
Diellia unisora (ncn)	Ferns	3	Endangered
Diplazium molokaiense (ncn)	Ferns	2	Endangered
Dogweed, Ashy	Dicot	1	Endangered
Dragonfly, Hine's Emerald	Insect	11	Endangered
Dropwort, Canby's	Dicot	26	Endangered
Dubautia latifolia (ncn)	Dicot	2	Endangered
Dubautia pauciflorula (ncn)	Dicot	2	Endangered
Duck, Hawaiian (Koloa)	Bird	5	Endangered
Duck, Laysan	Bird	1	Endangered
Dudleya, Santa Clara Valley	Dicot	20	Endangered
Elepaio, Oahu	Bird	1	Endangered
Evening-primrose, Antioch Dunes	Dicot	9	Endangered
Evening-primrose, Eureka Valley	Dicot	1	Endangered
Fairy Shrimp, Conservancy Fairy	Crustacean	29	Endangered
Fairy Shrimp, Longhorn	Crustacean	19	Endangered
Fairy Shrimp, Riverside	Crustacean	18	Endangered
Fairy Shrimp, San Diego	Crustacean	3	Endangered
Falcon, Northern Aplomado	Bird	46	Endangered
Fanshell	Bivalve	22	Endangered
Fern, Pendant Kihi (Adenophorus periens)	Ferns	6	Endangered
Ferret, Black-footed	Mammal	34	Endangered
Fiddleneck, Large-flowered	Dicot	13	Endangered
Finch, Laysan	Bird	1	Endangered

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Finch, Nihoa	Bird	1	Endangered
Flannelbush, Mexican	Dicot	3	Endangered
Flannelbush, Pine Hill	Dicot	3	Endangered
Fly, Delhi Sands Flower-loving	Insect	10	Endangered
Flycatcher, Southwestern Willow	Bird	86	Endangered
Fox, San Joaquin Kit	Mammal	71	Endangered
Fox, San Miguel Island	Mammal	5	Endangered
Fox, Santa Catalina Island	Mammal	6	Endangered
Fox, Santa Cruz Island	Mammal	5	Endangered
Fox, Santa Rosa Island	Mammal	5	Endangered
Frankenia, Johnston's	Dicot	1	Endangered
Fringe Tree, Pygmy	Dicot	6	Endangered
Fringepod, Santa Cruz Island	Dicot	5	Endangered
Fritillary, Gentner's	Monocot	4	Endangered
Frog, Dusky Gopher (Mississippi DPS)	Amphibian	1	Endangered
Frog, Mountain Yellow-legged	Amphibian	14	Endangered
Gahnia Lanaiensis (ncn)	Monocot	2	Endangered
Gambusia, Big Bend	Fish	1	Endangered
Gambusia, Clear Creek	Fish	1	Endangered
Gambusia, Pecos	Fish	8	Endangered
Gambusia, San Marcos	Fish	6	Endangered
Geranium, Hawaiian Red-flowered	Dicot	2	Endangered
Gerardia, Sandplain	Dicot	2	Endangered
Gilia, Hoffmann's Slender-flowered	Dicot	5	Endangered
Gilia, Monterey	Dicot	2	Endangered
Goby, Tidewater	Fish	52	Endangered
Golden Sunburst, Hartweg's	Dicot	15	Endangered
Goldenrod, Short's	Dicot	5	Endangered
Goldfields, Burke's	Dicot	11	Endangered
Goldfields, Contra Costa	Dicot	29	Endangered
Goose, Hawaiian (Nene)	Bird	6	Endangered
Gouania hillebrandii (ncn)	Dicot	2	Endangered
Gouania meyenii (ncn)	Dicot	3	Endangered
Gouania vitifolia (ncn)	Dicot	1	Endangered
Gourd, Okeechobee	Dicot	1	Endangered
Grass, California Orcutt	Monocot	12	Endangered
Grass, Eureka Dune	Monocot	1	Endangered
Grass, Fosberg's Love	Monocot	1	Endangered
Grass, Hairy Orcutt	Dicot	42	Endangered
Grass, Sacramento Orcutt	Dicot	6	Endangered
Grass, Solano	Monocot	7	Endangered
Grass, Tennessee Yellow-eyed	Monocot	4	Endangered
Grasshopper, Zayante Band-winged	Insect	1	Endangered
Ground-plum, Guthrie's	Dicot	1	Endangered
Haha (Cyanea acuminata)	Dicot	1	Endangered
Haha (Cyanea asarifolia)	Dicot	2	Endangered
Haha (Cyanea copelandii ssp. copelandii)	Dicot	2	Endangered
Haha (Cyanea copelandii ssp. haleakalaensis)	Dicot	2	Endangered
Haha (Cyanea Crispa) (=Rollandia crispa)	Dicot	1	Endangered
Haha (Cyanea dunbarii)	Dicot	2	Endangered
Haha (Cyanea glabra)	Dicot	2	Endangered
Haha (Cyanea grimesiana ssp. grimesiana)	Dicot	3	Endangered
Haha (Cyanea grimesiana ssp. obatae)	Dicot	1	Endangered
Haha (Cyanea hamatiflora ssp. carlsonii)	Dicot	2	Endangered
Haha (Cyanea hamatiflora ssp. hamatiflora)	Dicot	2	Endangered
Haha (Cyanea humboldtiana)	Dicot	1	Endangered
Haha (Cyanea koolauensis)	Dicot	1	Endangered

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Haha (Cyanea longiflora)	Dicot	1	Endangered
Haha (Cyanea Macrostegia var. gibsonii)	Dicot	2	Endangered
Haha (Cyanea mannii)	Dicot	2	Endangered
Haha (Cyanea mceldowneyi)	Dicot	2	Endangered
Haha (Cyanea pinnatifida)	Dicot	1	Endangered
Haha (Cyanea platyphylla)	Dicot	2	Endangered
Haha (Cyanea procera)	Dicot	2	Endangered
Haha (Cyanea remyi)	Dicot	2	Endangered
Haha (Cyanea shipmanii)	Dicot	2	Endangered
Haha (Cyanea stictophylla)	Dicot	2	Endangered
Haha (Cyanea St-Johnii) (=Rollandia St-Johnii)	Dicot	1	Endangered
Haha (Cyanea superba)	Dicot	1	Endangered
Ha'Iwale (Cyrtandra crenata)	Dicot	1	Endangered
Ha'Iwale (Cyrtandra dentata)	Dicot	1	Endangered
Ha'Iwale (Cyrtandra giffardii)	Dicot	2	Endangered
Ha'Iwale (Cyrtandra munroi)	Dicot	2	Endangered
Ha'Iwale (Cyrtandra polyantha)	Dicot	1	Endangered
Ha'Iwale (Cyrtandra subumbellata)	Dicot	1	Endangered
Ha'Iwale (Cyrtandra tintinnabula)	Dicot	1	Endangered
Ha'Iwale (Cyrtandra viridiflora)	Dicot	1	Endangered
Hala Pepe (Pleomele hawaiiensis)	Monocot	2	Endangered
Haplostachys Haplostachya (ncn)	Dicot	2	Endangered
Harebells, Avon Park	Dicot	2	Endangered
Harperella	Dicot	21	Endangered
Harvestman, Bee Creek Cave	Arachnid	4	Endangered
Harvestman, Bone Cave	Arachnid	2	Endangered
Harvestman, Robber Baron Cave	Arachnid	1	Endangered
Hau Kauhiwi (Hibiscadelphus woodi)	Dicot	2	Endangered
Hau Kuahiwi (Hibiscadelphus distans)	Dicot	2	Endangered
Hawk, Hawaiian (Io)	Bird	2	Endangered
Heau (Exocarpos luteolus)	Dicot	2	Endangered
Hedyotis degeneri (ncn)	Dicot	1	Endangered
Hedyotis parvula (ncn)	Dicot	1	Endangered
Hedyotis St.-Johnii (ncn)	Dicot	2	Endangered
Hesperomannia arborescens (ncn)	Dicot	3	Endangered
Hesperomannia arbuscula (ncn)	Dicot	3	Endangered
Hesperomannia lydgatei (ncn)	Dicot	2	Endangered
Hibiscus, Clay's	Dicot	2	Endangered
Hilo Ischaemum (Ischaemum byrone)	Monocot	6	Endangered
Holei (Ochrosia kilaueaensis)	Dicot	2	Endangered
Honeycreeper, Crested ('Akohekohe)	Bird	2	Endangered
Hypericum, Highlands Scrub	Dicot	2	Endangered
'Ihi'Ihi (Marsilea villosa)	Ferns	3	Endangered
Iliau (Wilkesia hobdyi)	Dicot	2	Endangered
Irisette, White	Monocot	2	Endangered
Isopod, Lee County Cave	Crustacean	3	Endangered
Jacquemontia, Beach	Dicot	4	Endangered
Jaguar	Mammal	15	Endangered
Jaguarundi, Gulf Coast	Mammal	19	Endangered
Jaguarundi, Sinaloan	Mammal	15	Endangered
Jewelflower, California	Dicot	30	Endangered
Jewelflower, Tiburon	Dicot	2	Endangered
Kamakahala (Labordia cyrtandrae)	Dicot	1	Endangered
Kamakahala (Labordia lydgatei)	Dicot	2	Endangered
Kamakahala (Labordia tinifolia var. lanaiensis)	Dicot	2	Endangered
Kamakahala (Labordia tinifolia var. wahiawaen)	Dicot	2	Endangered
Kamakahala (Labordia triflora)	Dicot	2	Endangered

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Kamanomano (Cenchrus agrimonioides)	Monocot	3	Endangered
Kanaloa kahoolawensis (ncn)	Dicot	2	Endangered
Kangaroo Rat, Fresno	Mammal	21	Endangered
Kangaroo Rat, Giant	Mammal	40	Endangered
Kangaroo Rat, Morro Bay	Mammal	5	Endangered
Kangaroo Rat, San Bernardino Merriam's	Mammal	8	Endangered
Kangaroo Rat, Stephens'	Mammal	11	Endangered
Kangaroo Rat, Tipton	Mammal	15	Endangered
Kauila (Colubrina oppositifolia)	Dicot	2	Endangered
Kaulu (Pteralyxia kauaiensis)	Dicot	2	Endangered
Kidneyshell, Triangular	Bivalve	11	Endangered
Kio'Ele (Hedyotis coriacea)	Dicot	4	Endangered
Kiponapona (Phyllostegia racemosa)	Dicot	2	Endangered
Kite, Everglade Snail	Bird	18	Endangered
Koki'o (Kokia drynarioides)	Dicot	2	Endangered
Koki'o (Kokia kauaiensis)	Dicot	2	Endangered
Koki'o Ke'oke'o (Hibiscus arnottianus ssp. immaculatus)	Dicot	2	Endangered
Koki'o Ke'oke'o (Hibiscus waimeae ssp. hannerae)	Dicot	2	Endangered
Kolea (Myrsine juddii)	Dicot	1	Endangered
Ko'oko'olau (Bidens micrantha ssp. kalealaha)	Dicot	2	Endangered
Ko'oko'olau (Bidens wiebkei)	Dicot	2	Endangered
Ko'oloa'ula (Abutilon menziesii)	Dicot	4	Endangered
Kopa (Hedyotis schlechtendahliana var. remyi)	Dicot	2	Endangered
Kuawawaenohu (Alsinidendron lychnoides)	Dicot	2	Endangered
Kulu'I (Nototrichium humile)	Dicot	3	Endangered
Ladies'-tresses, Canelo Hills	Monocot	4	Endangered
Ladies'-tresses, Navasota	Monocot	15	Endangered
Larkspur, Baker's	Dicot	6	Endangered
Larkspur, San Clemente Island	Dicot	6	Endangered
Larkspur, Yellow	Dicot	6	Endangered
Lau'ehu (Panicum niihauense)	Monocot	2	Endangered
Laukahi Kuahiwi (Plantago hawaiensis)	Dicot	2	Endangered
Laukahi Kuahiwi (Plantago princeps)	Dicot	5	Endangered
Laulihilihi (Schiedea stellarioides)	Dicot	2	Endangered
Layia, Beach	Dicot	13	Endangered
Lead-plant, Crenulate	Dicot	2	Endangered
Leather-flower, Alabama	Dicot	2	Endangered
Leather-flower, Morefield's	Dicot	1	Endangered
Lessingia, San Francisco	Dicot	1	Endangered
Lichen, Rock Gnome	Lichen	1	Endangered
Lily, Minnesota Trout	Monocot	1	Endangered
Lily, Pitkin Marsh	Monocot	4	Endangered
Lily, Western	Monocot	6	Endangered
Lipochaeta venosa (ncn)	Dicot	2	Endangered
Liveforever, Santa Barbara Island	Dicot	5	Endangered
Lizard, Blunt-nosed Leopard	Reptile	54	Endangered
Lo`ulu (Pritchardia affinis)	Monocot	2	Endangered
Lo`ulu (Pritchardia kaalae)	Monocot	1	Endangered
Lo`ulu (Pritchardia munroi)	Monocot	2	Endangered
Lo`ulu (Pritchardia napaliensis)	Monocot	2	Endangered
Lo`ulu (Pritchardia remota)	Monocot	1	Endangered
Lo`ulu (Pritchardia schattaueri)	Monocot	2	Endangered
Lo`ulu (Pritchardia viscosa)	Monocot	2	Endangered
Lobelia monostachya (ncn)	Dicot	1	Endangered
Lobelia niihauensis (ncn)	Dicot	3	Endangered
Lobelia oahuensis (ncn)	Dicot	1	Endangered
Logperch, Conasauga	Fish	1	Endangered

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Logperch, Roanoke	Fish	11	Endangered
Lomatium, Bradshaw's	Dicot	10	Endangered
Lomatium, Cook's	Dicot	4	Endangered
Loosestrife, Rough-leaved	Dicot	22	Endangered
Lupine, Clover	Dicot	13	Endangered
Lupine, Nipomo Mesa	Dicot	5	Endangered
Lupine, Scrub	Dicot	2	Endangered
Lysimachia filifolia (ncn)	Dicot	3	Endangered
Lysimachia lydgatei (ncn)	Dicot	3	Endangered
Lysimachia maxima (ncn)	Dicot	2	Endangered
Mahoe (Alectryon macrococcus)	Dicot	5	Endangered
Malacothrix, Island	Dicot	5	Endangered
Malacothrix, Santa Cruz Island	Dicot	10	Endangered
Mallow, Kern	Dicot	5	Endangered
Manatee, West Indian	Marine mml	64	Endangered
Manioc, Walker's	Dicot	1	Endangered
Manzanita, Del Mar	Dicot	3	Endangered
Manzanita, Santa Rosa Island	Dicot	5	Endangered
Ma'o Hau Hele (Hibiscus brackenridgei)	Dicot	5	Endangered
Ma'oli'oli (Schiedea apokrinnos)	Dicot	2	Endangered
Ma'oli'oli (Schiedea kealiae)	Dicot	1	Endangered
Mapele (Cyrtandra cyaneoides)	Dicot	2	Endangered
Mariscus fauriei (ncn)	Monocot	4	Endangered
Mariscus pennatiformis (ncn)	Monocot	7	Endangered
Meadowfoam, Butte County	Dicot	10	Endangered
Meadowfoam, Large-flowered Woolly	Dicot	2	Endangered
Meadowfoam, Sebastopol	Dicot	4	Endangered
Meadowrue, Cooley's	Dicot	5	Endangered
Mehamehame (Flueggea neowawraea)	Dicot	7	Endangered
Meshweaver, Braken Bat Cave	Arachnid	1	Endangered
Milkpea, Small's	Dicot	2	Endangered
Milk-vetch, Braunton's	Dicot	11	Endangered
Milk-vetch, Clara Hunt's	Dicot	8	Endangered
Milk-vetch, Coachella Valley	Dicot	4	Endangered
Milk-vetch, Coastal Dunes	Dicot	2	Endangered
Milk-vetch, Cushenbury	Dicot	4	Endangered
Milk-vetch, Holmgren	Dicot	8	Endangered
Milk-vetch, Jesup's	Dicot	1	Endangered
Milk-vetch, Lane Mountain	Dicot	4	Endangered
Milk-vetch, Shivwits	Dicot	4	Endangered
Milk-vetch, Triple-ribbed	Dicot	8	Endangered
Milk-vetch, Ventura Marsh	Dicot	10	Endangered
Millerbird, Nihoa	Bird	1	Endangered
Minnow, Rio Grande Silvery	Fish	9	Endangered
Mint, Garrett's	Dicot	1	Endangered
Mint, Longspurred	Dicot	1	Endangered
Mint, Otay Mesa	Dicot	7	Endangered
Mint, San Diego Mesa	Dicot	3	Endangered
Mint, Scrub	Dicot	1	Endangered
Monardella, Willowy	Dicot	3	Endangered
Monkey-flower, Michigan	Dicot	2	Endangered
Moorhen, Hawaiian Common	Bird	5	Endangered
Morning-glory, Stebbins	Dicot	3	Endangered
Moth, Blackburn's Sphinx	Insect	4	Endangered
Mountain Beaver, Point Arena	Mammal	3	Endangered
Mountainbalm, Indian Knob	Dicot	5	Endangered
Mountain-mahogany, Catalina Island	Dicot	6	Endangered

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Mouse, Alabama Beach	Mammal	1	Endangered
Mouse, Choctawhatchee Beach	Mammal	3	Endangered
Mouse, Pacific Pocket	Mammal	9	Endangered
Mouse, Perdido Key Beach	Mammal	2	Endangered
Mouse, Salt Marsh Harvest	Mammal	26	Endangered
Mucket, Pink (Pearlymussel)	Bivalve	64	Endangered
Munroidendron racemosum (ncn)	Dicot	2	Endangered
Mussel, Acornshell Southern	Bivalve	4	Endangered
Mussel, Black (=Curtus' Mussel) Clubshell	Bivalve	3	Endangered
Mussel, Clubshell	Bivalve	16	Endangered
Mussel, Coosa Moccasinshell	Bivalve	5	Endangered
Mussel, Cumberland Combshell	Bivalve	7	Endangered
Mussel, Cumberland Elktoe	Bivalve	2	Endangered
Mussel, Dark Pigtoe	Bivalve	4	Endangered
Mussel, Dwarf Wedge	Bivalve	25	Endangered
Mussel, Fine-rayed Pigtoe	Bivalve	7	Endangered
Mussel, Flat Pigtoe (=Marshall's Mussel)	Bivalve	1	Endangered
Mussel, Gulf Moccasinshell	Bivalve	23	Endangered
Mussel, Heavy Pigtoe (=Judge Tait's Mussel)	Bivalve	10	Endangered
Mussel, Heelsplitter Carolina	Bivalve	9	Endangered
Mussel, Ochlockonee Moccasinshell	Bivalve	5	Endangered
Mussel, Oval Pigtoe	Bivalve	33	Endangered
Mussel, Ovate Clubshell	Bivalve	19	Endangered
Mussel, Oyster	Bivalve	7	Endangered
Mussel, Ring Pink (=Golf Stick Pearly)	Bivalve	14	Endangered
Mussel, Rough Pigtoe	Bivalve	13	Endangered
Mussel, Scaleshell	Bivalve	29	Endangered
Mussel, Shiny Pigtoe	Bivalve	7	Endangered
Mussel, Shiny-rayed Pocketbook	Bivalve	27	Endangered
Mussel, Southern Clubshell	Bivalve	19	Endangered
Mussel, Southern Pigtoe	Bivalve	6	Endangered
Mussel, Speckled Pocketbook	Bivalve	1	Endangered
Mussel, Winged Mapleleaf	Bivalve	4	Endangered
Mustard, Carter's	Dicot	2	Endangered
Mustard, Slender-petaled	Dicot	4	Endangered
Na'ena'e (Dubautia herbstobatae)	Dicot	1	Endangered
Na'ena'e (Dubautia plantaginea ssp. humilis)	Dicot	2	Endangered
Nani Wai'ale'ale (Viola kauaensis var. wahiawaensis)	Dicot	2	Endangered
Nanu (Gardenia mannii)	Dicot	1	Endangered
Na'u (Gardenia brighamii)	Dicot	3	Endangered
Naupaka, Dwarf (Scaevola coriacea)	Dicot	2	Endangered
Navarretia, Few-flowered	Dicot	27	Endangered
Navarretia, Many-flowered	Dicot	27	Endangered
Nehe (Lipochaeta fauriei)	Dicot	2	Endangered
Nehe (Lipochaeta kamolensis)	Dicot	2	Endangered
Nehe (Lipochaeta lobata var. leptophylla)	Dicot	1	Endangered
Nehe (Lipochaeta micrantha)	Dicot	2	Endangered
Nehe (Lipochaeta tenuifolia)	Dicot	1	Endangered
Nehe (Lipochaeta waimeaensis)	Dicot	2	Endangered
Neraudia angulata (ncn)	Dicot	1	Endangered
Neraudia ovata (ncn)	Dicot	2	Endangered
Neraudia sericea (ncn)	Dicot	4	Endangered
Nioi (Eugenia koolauensis)	Dicot	1	Endangered
Niterwort, Amargosa	Dicot	4	Endangered
Nohoanu (Geranium multiflorum)	Dicot	4	Endangered
Nuku Pu'u	Bird	4	Endangered
Ocelot	Mammal	28	Endangered

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'Oha (Delissea rivularis)	Dicot	2	Endangered
'Oha (Delissea subcordata)	Dicot	1	Endangered
'Oha (Delissea undulata)	Dicot	2	Endangered
'Oha (Lobelia gaudichaudii koolauensis)	Dicot	1	Endangered
'Oha Wai (Clermontia drepanomorpha)	Dicot	2	Endangered
'Oha Wai (Clermontia lindseyana)	Dicot	4	Endangered
'Oha Wai (Clermontia oblongifolia ssp. brevipes)	Dicot	2	Endangered
'Oha Wai (Clermontia oblongifolia ssp. mauiensis)	Dicot	2	Endangered
'Oha Wai (Clermontia peleana)	Dicot	2	Endangered
'Oha Wai (Clermontia pyrularia)	Dicot	2	Endangered
'Oha Wai (Clermontia samuelii)	Dicot	2	Endangered
'Ohai (Sesbania tomentosa)	Dicot	7	Endangered
'Ohe'ohe (Tetraplasandra gymnocarpa)	Dicot	1	Endangered
'Olulu (Brighamia insignis)	Dicot	2	Endangered
Onion, Munz's	Monocot	4	Endangered
'O'o, Kauai (='A'a)	Bird	2	Endangered
Opuhe (Urera kaalae)	Dicot	1	Endangered
'O'u (Honeycreeper)	Bird	4	Endangered
Oxytheca, Cushenbury	Dicot	4	Endangered
Paintbrush, San Clemente Island Indian	Dicot	6	Endangered
Paintbrush, Soft-leaved	Dicot	5	Endangered
Paintbrush, Tiburon	Dicot	10	Endangered
Palila	Bird	2	Endangered
Pamakani (Viola chamissoniana ssp. chamissoniana)	Dicot	1	Endangered
Panicgrass, Carter's (Panicum fauriei var.carteri)	Monocot	3	Endangered
Panther, Florida	Mammal	11	Endangered
Parrotbill, Maui	Bird	2	Endangered
Pauoa (Ctenitis squamigera)	Ferns	3	Endangered
Pawpaw, Beautiful	Dicot	4	Endangered
Pawpaw, Four-petal	Dicot	2	Endangered
Pawpaw, Rugel's	Dicot	1	Endangered
Pearlymussel, Alabama Lamp	Bivalve	2	Endangered
Pearlymussel, Appalachian Monkeyface	Bivalve	4	Endangered
Pearlymussel, Birdwing	Bivalve	4	Endangered
Pearlymussel, Cracking	Bivalve	7	Endangered
Pearlymussel, Cumberland Bean	Bivalve	8	Endangered
Pearlymussel, Cumberland Monkeyface	Bivalve	4	Endangered
Pearlymussel, Curtis'	Bivalve	6	Endangered
Pearlymussel, Dromedary	Bivalve	6	Endangered
Pearlymussel, Fat Pocketbook	Bivalve	30	Endangered
Pearlymussel, Higgins' Eye	Bivalve	17	Endangered
Pearlymussel, Little-wing	Bivalve	13	Endangered
Pearlymussel, Orange-footed	Bivalve	14	Endangered
Pearlymussel, Pale Lilliput	Bivalve	1	Endangered
Pearlymussel, Purple Cat's Paw	Bivalve	3	Endangered
Pearlymussel, Tubercled-blossom	Bivalve	6	Endangered
Pearlymussel, Turgid-blossom	Bivalve	2	Endangered
Pearlymussel, White Cat's Paw	Bivalve	1	Endangered
Pearlymussel, White Wartyback	Bivalve	6	Endangered
Pearlymussel, Yellow-blossom	Bivalve	3	Endangered
Pebblesnail, Flat	Gastropod	2	Endangered
Pelican, Brown	Bird	105	Endangered
Penny-cress, Kneeland Prairie	Dicot	4	Endangered
Pennyroyal, Todsen's	Dicot	4	Endangered
Pentachaeta, Lyon's	Dicot	11	Endangered
Pentachaeta, White-rayed	Dicot	4	Endangered
Petrel, Hawaiian Dark-rumped	Bird	6	Endangered

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Phacelia, Clay	Dicot	1	Endangered
Phacelia, Island	Dicot	5	Endangered
Phlox, Texas Trailing	Dicot	3	Endangered
Phlox, Yreka	Dicot	3	Endangered
Phyllostegia hirsuta (ncn)	Dicot	1	Endangered
Phyllostegia kaalaensis (ncn)	Dicot	1	Endangered
Phyllostegia knudsenii (ncn)	Dicot	2	Endangered
Phyllostegia mannii (ncn)	Dicot	2	Endangered
Phyllostegia mollis (ncn)	Dicot	3	Endangered
Phyllostegia parviflora (ncn)	Dicot	1	Endangered
Phyllostegia velutina (ncn)	Dicot	2	Endangered
Phyllostegia waimeae (ncn)	Dicot	2	Endangered
Phyllostegia warshaueri (ncn)	Dicot	2	Endangered
Phyllostegia wawrana (ncn)	Dicot	2	Endangered
Pilo (Hedyotis mannii)	Dicot	2	Endangered
Pinkroot, Gentian	Dicot	3	Endangered
Piperia, Yadon's	Monocot	2	Endangered
Pitaya, Davis' Green	Dicot	1	Endangered
Pitcher-plant, Alabama Canebrake	Dicot	3	Endangered
Pitcher-plant, Green	Dicot	7	Endangered
Pitcher-plant, Mountain Sweet	Dicot	1	Endangered
Platanthera holochila (ncn)	Monocot	4	Endangered
Plover, Piping	Bird	177	Endangered
Plum, Scrub	Dicot	5	Endangered
Poa siphonoglossa (ncn)	Monocot	2	Endangered
Po'e (Portulaca sclerocarpa)	Dicot	4	Endangered
Polygala, Lewton's	Dicot	6	Endangered
Polygala, Tiny	Dicot	5	Endangered
Polygonum, Scott's Valley	Dicot	1	Endangered
Pondberry	Dicot	22	Endangered
Pondweed, Little Aguja Creek	Monocot	2	Endangered
Poolfish, Pahrump (= Pahrump Killifish)	Fish	5	Endangered
Po'ouli	Bird	2	Endangered
Popcornflower, Rough	Dicot	2	Endangered
Popolo 'Aiakeakua (Solanum sandwicense)	Dicot	3	Endangered
Popolo Ku Mai (Solanum incompletum)	Dicot	2	Endangered
Poppy, Sacramento Prickly	Dicot	2	Endangered
Poppy-mallow, Texas	Dicot	3	Endangered
Potentilla, Hickman's	Dicot	3	Endangered
Prairie-chicken, Attwater's Greater	Bird	10	Endangered
Pronghorn, Sonoran	Mammal	8	Endangered
Pseudoscorpion, Tooth Cave	Arachnid	1	Endangered
Pteris lidgatei (ncn)	Ferns	3	Endangered
Pua'ala (Brighamia rockii)	Dicot	2	Endangered
Pupfish, Ash Meadows Amargosa	Fish	3	Endangered
Pupfish, Comanche Springs	Fish	6	Endangered
Pupfish, Desert	Fish	32	Endangered
Pupfish, Devils Hole	Fish	5	Endangered
Pupfish, Leon Springs	Fish	1	Endangered
Pupfish, Owens	Fish	1	Endangered
Pupfish, Warm Springs	Fish	3	Endangered
Purple Bean	Bivalve	6	Endangered
Pu'uka'a (Cyperus trachysanthos)	Monocot	3	Endangered
Pygmy-owl, Cactus Ferruginous	Bird	20	Endangered
Quillwort, Black-spored	Ferns	8	Endangered
Quillwort, Louisiana	Ferns	17	Endangered
Quillwort, Mat-forming	Ferns	5	Endangered

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Rabbit, Pygmy	Mammal	7	Endangered
Rabbit, Riparian Brush	Mammal	6	Endangered
Rabbitsfoot, Rough	Bivalve	4	Endangered
Rail, California Clapper	Bird	33	Endangered
Rail, Light-footed Clapper	Bird	19	Endangered
Rail, Yuma Clapper	Bird	26	Endangered
Rattleweed, Hairy	Dicot	2	Endangered
Reed-mustard, Barneby	Dicot	1	Endangered
Reed-mustard, Shrubby	Dicot	1	Endangered
Remya kauaiensis (ncn)	Dicot	2	Endangered
Remya montgomeryi (ncn)	Dicot	2	Endangered
Remya, Maui	Dicot	2	Endangered
Rhadine exilis (ncn)	Insect	1	Endangered
Rhadine infernalis (ncn)	Insect	1	Endangered
Rhododendron, Chapman	Dicot	5	Endangered
Ridge-cress (=Pepper-cress), Barneby	Dicot	1	Endangered
Riffleshell, Northern	Bivalve	5	Endangered
Riffleshell, Tan	Bivalve	9	Endangered
Riversnail, Anthony's	Gastropod	1	Endangered
Rock-cress, Hoffmann's	Dicot	5	Endangered
Rock-cress, Large (=Braun's)	Dicot	2	Endangered
Rock-cress, McDonald's	Dicot	3	Endangered
Rock-cress, Santa Cruz Island	Dicot	6	Endangered
Rock-cress, Shale Barren	Dicot	3	Endangered
Rock-cress, Small	Dicot	1	Endangered
Rock-pocketbook, Ouachita (=Wheeler's pm)	Bivalve	6	Endangered
Rocksnail, Plicate	Gastropod	1	Endangered
Rosemary, Apalachicola	Dicot	1	Endangered
Rosemary, Etonia	Dicot	2	Endangered
Rosemary, Short-leaved	Dicot	2	Endangered
Rush-pea, Slender	Dicot	1	Endangered
Salamander, Barton Springs	Amphibian	2	Endangered
Salamander, California Tiger	Amphibian	87	Endangered
Salamander, Desert Slender	Amphibian	4	Endangered
Salamander, Santa Cruz Long-toed	Amphibian	3	Endangered
Salamander, Shenandoah	Amphibian	3	Endangered
Salamander, Sonora Tiger	Amphibian	4	Endangered
Salamander, Texas Blind	Amphibian	6	Endangered
Salmon, Chinook (Sacramento River Winter Run)	Fish	58	Endangered
Salmon, Chinook (Upper Columbia River Spring)	Fish	23	Endangered
Salmon, Coho (Central California Coast population)	Fish	15	Endangered
Salmon, Sockeye (Snake River population)	Fish	16	Endangered
Sandalwood, Lanai (='Iliahi)	Dicot	2	Endangered
Sandlace	Dicot	4	Endangered
Sand-verbena, Large-fruited	Dicot	3	Endangered
Sandwort, Cumberland	Dicot	1	Endangered
Sandwort, Marsh	Dicot	5	Endangered
Sanicula mariversa (ncn)	Dicot	1	Endangered
Sanicula purpurea (ncn)	Dicot	2	Endangered
Sawfish, Smalltooth	Fish	6	Endangered
Schiedea haleakalensis (ncn)	Dicot	2	Endangered
Schiedea helleri (ncn)	Dicot	2	Endangered
Schiedea hookeri (ncn)	Dicot	1	Endangered
Schiedea kaalae (ncn)	Dicot	1	Endangered
Schiedea kauaiensis (ncn)	Dicot	2	Endangered
Schiedea lydgatei (ncn)	Dicot	2	Endangered
Schiedea membranacea (ncn)	Dicot	2	Endangered

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Schiedea nuttallii (ncn)	Dicot	3	Endangered
Schiedea sarmentosa (ncn)	Dicot	2	Endangered
Schiedea spergulina var. leiopoda (ncn)	Dicot	2	Endangered
Schiedea verticillata (ncn)	Dicot	1	Endangered
Schiedea, Diamond Head (Schiedea adamantis)	Dicot	1	Endangered
Sea turtle, green	Reptile	60	Endangered
Sea turtle, hawksbill	Reptile	36	Endangered
Sea turtle, Kemp's ridley	Reptile	36	Endangered
Sea turtle, leatherback	Reptile	55	Endangered
Sea-blite, California	Dicot	5	Endangered
Seal, Hawaiian Monk	Marine mml	7	Endangered
Sedge, Golden	Monocot	1	Endangered
Sedge, White	Monocot	4	Endangered
Sheep, Peninsular Bighorn	Mammal	10	Endangered
Sheep, Sierra Nevada Bighorn	Mammal	4	Endangered
Shiner, Cahaba	Fish	4	Endangered
Shiner, Cape Fear	Fish	4	Endangered
Shiner, Palezone	Fish	2	Endangered
Shiner, Topeka	Fish	29	Endangered
Shrew, Buena Vista Lake Ornate	Mammal	5	Endangered
Shrike, San Clemente Loggerhead	Bird	6	Endangered
Shrimp, Alabama Cave	Crustacean	1	Endangered
Shrimp, California Freshwater	Crustacean	10	Endangered
Silene alexandri (ncn)	Dicot	2	Endangered
Silene lanceolata (ncn)	Dicot	7	Endangered
Silene perlmanii (ncn)	Dicot	1	Endangered
Silversword, Ka'u (Argyroxiphium kauense)	Dicot	2	Endangered
Silversword, Mauna Kea ('Ahinahina)	Dicot	4	Endangered
Skipper, Laguna Mountain	Insect	3	Endangered
Snail, Iowa Pleistocene	Gastropod	6	Endangered
Snail, Lioplax Cylindrical	Gastropod	2	Endangered
Snail, Morro Shoulderband	Gastropod	5	Endangered
Snail, O'ahu Tree (Achatinella abbreviata)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella apexfulva)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella bellula)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella buddii)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella bulimoides)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella byronii)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella caesia)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella casta)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella cestus)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella concavospira)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella curta)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella decipiens)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella decora)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella dimorpha)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella elegans)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella fulgens)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella fuscobasis)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella juddii)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella juncea)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella lehuiensis)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella leucorraphe)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella lila)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella livida)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella lorata)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella mustelina)	Gastropod	1	Endangered

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Snail, O'ahu Tree (Achatinella papyracea)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella phaeozona)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella pulcherrima)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella pupukanioe)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella rosea)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella sowerbyana)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella spaldingi)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella stewartii)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella swiftii)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella taeniolata)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella thaanumi)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella turgida)	Gastropod	1	Endangered
Snail, O'ahu Tree (Achatinella valida)	Gastropod	1	Endangered
Snail, Pecos Assiminea	Gastropod	5	Endangered
Snail, Tulotoma	Gastropod	5	Endangered
Snail, Virginia Fringed Mountain	Gastropod	1	Endangered
Snake, San Francisco Garter	Reptile	2	Endangered
Snakeroot	Dicot	3	Endangered
Snowbells, Texas	Dicot	7	Endangered
Sparrow, Cape Sable Seaside	Bird	2	Endangered
Sparrow, Florida Grasshopper	Bird	5	Endangered
Spermolepis hawaiiensis (ncn)	Dicot	7	Endangered
Spider, Government Canyon Cave	Arachnid	1	Endangered
Spider, Kauai Cave Wolf	Arachnid	2	Endangered
Spider, Madla's Cave	Arachnid	1	Endangered
Spider, Robber Baron Cave	Arachnid	1	Endangered
Spider, Tooth Cave	Arachnid	1	Endangered
Spider, Vesper Cave	Arachnid	1	Endangered
Spinedace, White River	Fish	3	Endangered
Spineflower, Ben Lomond	Dicot	1	Endangered
Spineflower, Howell's	Dicot	3	Endangered
Spineflower, Orcutt's	Dicot	3	Endangered
Spineflower, Robust	Dicot	3	Endangered
Spineflower, Scotts Valley	Dicot	1	Endangered
Spineflower, Slender-horned	Dicot	17	Endangered
Spineflower, Sonoma	Dicot	6	Endangered
Spinymussel, James River	Bivalve	11	Endangered
Spinymussel, Tar River	Bivalve	6	Endangered
Springfish, Hiko White River	Fish	1	Endangered
Springfish, White River	Fish	1	Endangered
Springsnail, Koster's	Gastropod	2	Endangered
Springsnail, Roswell	Gastropod	2	Endangered
Spurge, Deltoid	Dicot	2	Endangered
Squawfish, Colorado	Fish	16	Endangered
Squirrel, Carolina Northern Flying	Mammal	1	Endangered
Squirrel, Mount Graham Red	Mammal	3	Endangered
Squirrel, Virginia Northern Flying	Mammal	1	Endangered
Starling, Ponape Mountain	Bird	1	Endangered
Steelhead, (Southern California population)	Fish	24	Endangered
Stenogyne angustifolia (ncn)	Dicot	2	Endangered
Stenogyne bifida (ncn)	Dicot	2	Endangered
Stenogyne campanulata (ncn)	Dicot	2	Endangered
Stenogyne kanehoana (ncn)	Dicot	1	Endangered
Stickleback, Unarmored Threespine	Fish	18	Endangered
Stickseed, Showy	Dicot	3	Endangered
Stickyseed, Baker's	Dicot	4	Endangered
Stilt, Hawaiian (=Ae'o)	Bird	7	Endangered

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Stirrupshell	Bivalve	4	Endangered
Stonecrop, Lake County	Dicot	27	Endangered
Stork, Wood	Bird	190	Endangered
Sturgeon, Alabama	Fish	4	Endangered
Sturgeon, Pallid	Fish	123	Endangered
Sturgeon, Shortnose	Fish	72	Endangered
Sturgeon, White	Fish	2	Endangered
Sucker, June	Fish	1	Endangered
Sucker, Lost River	Fish	3	Endangered
Sucker, Razorback	Fish	35	Endangered
Sumac, Michaux's	Dicot	21	Endangered
Sunflower, San Mateo Woolly	Dicot	1	Endangered
Sunflower, Schweinitz's	Dicot	13	Endangered
Tadpole Shrimp, Vernal Pool	Crustacean	99	Endangered
Taraxacum, California	Dicot	4	Endangered
Tarplant, Gaviota	Dicot	5	Endangered
Tern, California Least	Bird	39	Endangered
Tern, Interior (population) Least	Bird	175	Endangered
Tern, Roseate	Bird	6	Endangered
Tetramolopium arenarium (ncn)	Dicot	2	Endangered
Tetramolopium capillare (ncn)	Dicot	2	Endangered
Tetramolopium filiforme (ncn)	Dicot	1	Endangered
Tetramolopium lepidotum ssp. lepidotum (ncn)	Dicot	1	Endangered
Tetramolopium remyi (ncn)	Dicot	2	Endangered
Thistle, Chorro creek Bog	Dicot	5	Endangered
Thistle, Fountain	Dicot	10	Endangered
Thistle, La Graciosa	Dicot	10	Endangered
Thistle, Suisun	Dicot	4	Endangered
Thornmint, San Mateo	Dicot	1	Endangered
Threeridge, Fat (Mussel)	Bivalve	6	Endangered
Thrush, Large Kauai	Bird	2	Endangered
Thrush, Molokai (Oloma'o)	Bird	2	Endangered
Thrush, Small Kauai (Puaiohi)	Bird	2	Endangered
Toad, Arroyo Southwestern	Amphibian	31	Endangered
Toad, Houston	Amphibian	16	Endangered
Topminnow, Gila (Yaqui)	Fish	20	Endangered
Torreya, Florida	Conf/cycds	6	Endangered
Trematolobelia singularis (ncn)	Dicot	1	Endangered
Trillium, Persistent	Monocot	2	Endangered
Trillium, Relict	Monocot	15	Endangered
Trout, Gila	Fish	7	Endangered
Tuctoria, Green's	Dicot	42	Endangered
Turtle, Alabama Red-bellied	Reptile	2	Endangered
Uhiuhi (Caesalpinia kavaiensis)	Dicot	5	Endangered
Ulihi (Phyllostegia glabra var. lanaiensis)	Dicot	2	Endangered
Umbel, Huachuca Water	Dicot	6	Endangered
Vetch, Hawaiian (Vicia menziesii)	Dicot	2	Endangered
Vigna o-wahuensis (ncn)	Dicot	6	Endangered
Viola helenae (ncn)	Dicot	2	Endangered
Viola lanaiensis (ncn)	Dicot	2	Endangered
Viola oahuensis (ncn)	Dicot	1	Endangered
Vireo, Black-capped	Bird	80	Endangered
Vireo, Least Bell's	Bird	40	Endangered
Vole, Amargosa	Mammal	5	Endangered
Vole, Florida Salt Marsh	Mammal	2	Endangered
Vole, Hualapai Mexican	Mammal	4	Endangered
Wahane (Pritchardia aylmer-robinsonii)	Monocot	2	Endangered

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Wahine Noho Kula (Isodendrion pyrifolium)	Dicot	2	Endangered
Wallflower, Ben Lomond	Dicot	1	Endangered
Wallflower, Contra Costa	Dicot	4	Endangered
Wallflower, Menzie's	Dicot	9	Endangered
Warbler (=Wood), Golden-cheeked	Bird	44	Endangered
Warbler (=Wood), Kirtland's	Bird	8	Endangered
Warbler, Bachman's	Bird	5	Endangered
Warea, Wide-leaf	Dicot	4	Endangered
Watercress, Gambel's	Dicot	23	Endangered
Wawae'Iole (Phlegmariurus (=Huperzia) mannii)	Ferns	4	Endangered
Wawae'Iole (Phlegmariurus (=Lycopodium) nutans)	Ferns	1	Endangered
Whale, Finback	Marine mml	4	Endangered
Whale, Humpback	Marine mml	4	Endangered
Wild-rice, Texas	Monocot	6	Endangered
Wireweed	Dicot	2	Endangered
Wolf, Gray	Mammal	34	Endangered
Woodland-star, San Clemente Island	Dicot	6	Endangered
Woodpecker, Ivory-billed	Bird	3	Endangered
Woodpecker, Red-cockaded	Bird	374	Endangered
Woodrat, Riparian	Mammal	6	Endangered
Woolly-star, Santa Ana River	Dicot	8	Endangered
Woolly-threads, San Joaquin	Dicot	32	Endangered
Woundfin	Fish	10	Endangered
Xylosma crenatum (ncn)	Dicot	2	Endangered
Yerba Santa, Lompoc	Dicot	5	Endangered
Ziziphus, Florida	Dicot	2	Endangered
Adobe Sunburst, San Joaquin	Dicot	15	Threatened
Amaranth, Seabeach	Dicot	9	Threatened
Amole, Cammatta Canyon	Monocot	5	Threatened
Amole, Purple	Monocot	7	Threatened
Amphianthus, Little	Dicot	18	Threatened
Aster, Decurrent False	Dicot	18	Threatened
Aupaka (Isodendrion longifolium)	Dicot	3	Threatened
Baccharis, Encinitas	Dicot	3	Threatened
Bankclimber, Purple	Bivalve	20	Threatened
Barbara Buttons, Mohr's	Dicot	5	Threatened
Bear, Grizzly	Mammal	18	Threatened
Bear, Louisiana Black	Mammal	104	Threatened
Beetle, Delta Green Ground	Insect	4	Threatened
Beetle, Northeastern Beach Tiger	Insect	3	Threatened
Beetle, Puritan Tiger	Insect	1	Threatened
Beetle, Valley Elderberry Longhorn	Insect	77	Threatened
Birds-in-a-nest, White	Dicot	3	Threatened
Bladderpod, Lyrate	Dicot	3	Threatened
Bladderpod, Missouri	Dicot	9	Threatened
Blazing Star, Ash Meadows	Dicot	3	Threatened
Blazing Star, Heller's	Dicot	1	Threatened
Bluecurls, Hidden Lake	Dicot	4	Threatened
Bonamia, Florida	Dicot	11	Threatened
Brodiaea, Chinese Camp	Monocot	1	Threatened
Brodiaea, Thread-leaved	Monocot	17	Threatened
Buckwheat, Scrub	Dicot	7	Threatened
Buckwheat, Southern Mountain Wild	Dicot	4	Threatened
Butterfly, Bay Checkerspot (Wright's euphydryas)	Insect	12	Threatened
Butterfly, Oregon Silverspot	Insect	5	Threatened
Butterweed, Layne's	Dicot	4	Threatened
Butterwort, Godfrey's	Dicot	3	Threatened

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Cactus, Bunched Cory	Dicot	1	Threatened
Cactus, Chisos Mountain Hedgehog	Dicot	1	Threatened
Cactus, Cochise Pincushion	Dicot	4	Threatened
Cactus, Lee Pincushion	Dicot	1	Threatened
Cactus, Lloyd's Mariposa	Dicot	2	Threatened
Cactus, Siler Pincushion	Dicot	9	Threatened
Cactus, Uinta Basin Hookless	Dicot	1	Threatened
Cactus, Winkler	Dicot	1	Threatened
Caracara, Audubon's Crested	Bird	11	Threatened
Catchfly, Spalding's	Dicot	5	Threatened
Catfish, Yaqui	Fish	4	Threatened
Cavefish, Ozark	Fish	22	Threatened
Ceanothus, Vail Lake	Dicot	4	Threatened
Centaury, Spring-loving	Dicot	4	Threatened
Checker-mallow, Nelson's	Dicot	18	Threatened
Chub, Slender	Fish	3	Threatened
Chub, Spotfin	Fish	5	Threatened
Clarkia, Springville	Dicot	5	Threatened
Clover, Fleshy Owl's	Dicot	30	Threatened
Clover, Prairie Bush	Dicot	41	Threatened
Crocodile, American	Reptile	5	Threatened
Crownbeard, Big-leaved	Dicot	3	Threatened
Cycladenia, Jones	Dicot	5	Threatened
Cypress, Gowen	Conf/cycds	2	Threatened
Dace, Blackside	Fish	6	Threatened
Daisy, Lakeside	Dicot	2	Threatened
Daisy, Maguire	Dicot	1	Threatened
Daisy, Parish's	Dicot	8	Threatened
Darter, Bayou	Fish	5	Threatened
Darter, Cherokee	Fish	4	Threatened
Darter, Goldline	Fish	2	Threatened
Darter, Leopard	Fish	6	Threatened
Darter, Niangua	Fish	20	Threatened
Darter, Slackwater	Fish	2	Threatened
Darter, Snail	Fish	2	Threatened
Dudleya, Conejo	Dicot	5	Threatened
Dudleya, Marcescent	Dicot	11	Threatened
Dudleya, Santa Cruz Island	Dicot	5	Threatened
Dudleya, Santa Monica Mountains	Dicot	11	Threatened
Dudleya, Verity's	Dicot	5	Threatened
Dwarf-flax, Marin	Dicot	2	Threatened
Elimia, Lacy	Gastropod	1	Threatened
Evening-primrose, San Benito	Dicot	2	Threatened
Fairy Shrimp, Vernal Pool	Crustacean	117	Threatened
Fatmucket, Arkansas	Bivalve	2	Threatened
Fern, Alabama Streak-sorus	Ferns	1	Threatened
Fern, American hart's-tongue	Ferns	4	Threatened
Four-o'clock, Macfarlane's	Dicot	1	Threatened
Frog, California Red-legged	Amphibian	83	Threatened
Frog, Chiricahua Leopard	Amphibian	20	Threatened
Fruit, Earth (=geocarpon)	Dicot	16	Threatened
Gnatcatcher, Coastal California	Bird	22	Threatened
Goldenrod, Houghton's	Dicot	1	Threatened
Gooseberry, Miccosukee	Dicot	4	Threatened
Grass, Colusa	Monocot	25	Threatened
Grass, San Joaquin Valley Orcutt	Monocot	38	Threatened
Grass, Slender Orcutt	Dicot	26	Threatened

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Gumplant, Ash Meadows	Dicot	4	Threatened
Haha (Cyanea recta)	Dicot	2	Threatened
Ha'Iwale (Cyrtandra limahuliensis)	Dicot	2	Threatened
Heartleaf, Dwarf-flowered	Dicot	7	Threatened
Heather, Mountain Golden	Dicot	1	Threatened
Howellia, Water	Dicot	7	Threatened
Iris, Dwarf Lake	Monocot	1	Threatened
Isopod, Madison Cave	Crustacean	1	Threatened
Ivesia, Ash Meadows	Dicot	4	Threatened
Joint-vetch, Sensitive	Dicot	11	Threatened
Kolea (Myrsine linearifolia)	Dicot	2	Threatened
Ladies'-tresses, Ute	Monocot	8	Threatened
Lizard, Coachella Valley Fringe-toed	Reptile	4	Threatened
Lizard, Island Night	Reptile	16	Threatened
Lupine, Kincaid's	Dicot	14	Threatened
Madtom, Neosho	Fish	13	Threatened
Madtom, Yellowfin	Fish	4	Threatened
Makou (Peucedanum sandwicense)	Dicot	5	Threatened
Manzanita, Ione	Dicot	5	Threatened
Manzanita, Morro	Dicot	5	Threatened
Manzanita, Pallid	Dicot	7	Threatened
Milk-vetch, Ash Meadows	Dicot	3	Threatened
Milk-vetch, Deseret	Dicot	1	Threatened
Milk-vetch, Fish Slough	Dicot	1	Threatened
Milk-vetch, Pierson's	Dicot	2	Threatened
Milkweed, Mead's	Dicot	42	Threatened
Milkweed, Welsh's	Dicot	1	Threatened
Minnow, Devils River	Fish	1	Threatened
Minnow, Loach	Fish	19	Threatened
Monkshood, Northern Wild	Dicot	4	Threatened
Moth, Kern Primrose Sphinx	Insect	5	Threatened
Mouse, Preble's Meadow Jumping	Mammal	2	Threatened
Mucket, Orangenacre	Bivalve	13	Threatened
Murrelet, Marbled	Bird	74	Threatened
Mussel, Alabama Moccasinshell	Bivalve	13	Threatened
Mussel, Fine-lined Pocketbook	Bivalve	22	Threatened
Mussel, Heelsplitter Inflated	Bivalve	16	Threatened
Naucorid, Ash Meadows	Insect	3	Threatened
Navarretia, Spreading	Dicot	13	Threatened
Oak, Hinckley	Dicot	2	Threatened
Orchid, Eastern Prairie Fringed	Monocot	24	Threatened
Orchid, Western Prairie Fringed	Monocot	52	Threatened
Otter, Southern Sea	Marine mml	8	Threatened
Owl, Mexican Spotted	Bird	59	Threatened
Owl, Northern Spotted	Bird	96	Threatened
Paintbrush, Ash-grey Indian	Dicot	4	Threatened
Paintbrush, Golden	Dicot	4	Threatened
Pearlshell, Louisiana	Bivalve	2	Threatened
Pink, Swamp	Monocot	8	Threatened
Plover, Western Snowy	Bird	62	Threatened
Pogonia, Small Whorled	Monocot	39	Threatened
Potato-bean, Price's	Dicot	9	Threatened
Prairie Dog, Utah	Mammal	5	Threatened
Pussypaws, Mariposa	Dicot	12	Threatened
Rattlesnake, New Mexican Ridge-nosed	Reptile	6	Threatened
Rocksnail, Painted	Gastropod	4	Threatened
Rocksnail, Round	Gastropod	2	Threatened

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Rosemary, Cumberland	Dicot	1	Threatened
Roseroot, Leedy's	Dicot	1	Threatened
Rush-rose, Island	Dicot	6	Threatened
Salamander, Flatwoods	Amphibian	28	Threatened
Salamander, Red Hills	Amphibian	5	Threatened
Salamander, San Marcos	Amphibian	6	Threatened
Salmon, Chinook (California Coastal Run)	Fish	11	Threatened
Salmon, Chinook (Central Valley Fall Run)	Fish	11	Threatened
Salmon, Chinook (Central Valley Spring Run)	Fish	75	Threatened
Salmon, Chinook (Lower Columbia River)	Fish	14	Threatened
Salmon, Chinook (Puget Sound)	Fish	16	Threatened
Salmon, Chinook (Snake River Fall Run)	Fish	16	Threatened
Salmon, Chinook (Snake River spring/summer)	Fish	19	Threatened
Salmon, Chinook (Upper Willamette River)	Fish	25	Threatened
Salmon, Chum (Columbia River population)	Fish	10	Threatened
Salmon, Chum (Hood Canal Summer population)	Fish	6	Threatened
Salmon, Coho (Southern OR/Northern CA Coast)	Fish	26	Threatened
Salmon, Sockeye (Ozette Lake population)	Fish	1	Threatened
Sandwort, Bear Valley	Dicot	4	Threatened
Schiedea spergulina var. spergulina (ncn)	Dicot	2	Threatened
Scrub-Jay, Florida	Bird	34	Threatened
Sculpin, Pygmy	Fish	1	Threatened
Sea turtle, loggerhead	Reptile	77	Threatened
Sea turtle, olive ridley	Reptile	12	Threatened
Seagrass, Johnson's	Monocot	3	Threatened
Seal, Guadalupe Fur	Marine mml	5	Threatened
Shagreen, Magazine Mountain	Gastropod	1	Threatened
Shearwater, Newell's Townsend's	Bird	5	Threatened
Shiner, Arkansas River	Fish	30	Threatened
Shiner, Beautiful	Fish	6	Threatened
Shiner, Blue	Fish	4	Threatened
Shiner, Pecos Bluntnose	Fish	4	Threatened
Shrimp, Squirrel Chimney Cave	Crustacean	2	Threatened
Silene hawaiiensis (ncn)	Dicot	2	Threatened
Silverside, Waccamaw	Fish	1	Threatened
Silversword, Haleakala ('Ahinahina)	Dicot	4	Threatened
Skink, Blue-tailed Mole	Reptile	3	Threatened
Skink, Sand	Reptile	7	Threatened
Skipper, Pawnee Montane	Insect	1	Threatened
Skullcap, Florida	Dicot	1	Threatened
Skullcap, Large-flowered	Dicot	2	Threatened
Slabshell, Chipola	Bivalve	3	Threatened
Smelt, Delta	Fish	18	Threatened
Snail, Newcomb's	Gastropod	2	Threatened
Snake, Atlantic Salt Marsh	Reptile	1	Threatened
Snake, Concho Water	Reptile	13	Threatened
Snake, Eastern Indigo	Reptile	166	Threatened
Snake, Giant Garter	Reptile	45	Threatened
Snake, Northern Copperbelly Water	Reptile	4	Threatened
Sneezeweed, Virginia	Dicot	4	Threatened
Sparrow, San Clemente Sage	Bird	6	Threatened
Spikedace	Fish	19	Threatened
Spinedace, Big Spring	Fish	1	Threatened
Spineflower, Monterey	Dicot	3	Threatened
Spiraea, Virginia	Dicot	9	Threatened
Springfish, Railroad Valley	Fish	3	Threatened
Spurge, Garber's	Dicot	2	Threatened

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