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SHAUGHNESSY NO

28
REVIEW NO.

EEB REVIEW

DATE IN: 12-12-91 OUT: MAR 19 1992
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ID # :92 TX 0002

DATE OF SUBMISSION 11-25-91

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SRRD/RD **ACTION** CODE/TYPE OF REVIEW 510 SECT 18

MRID #(S) _____

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DP TYPE 001

PRODUCT MANAGER, NO. REBECCA COOL 41 LIBBY PEMBERTON

PRODUCT NAME(S) ESFENVALERATE

TYPE PRODUCT INSECTICIDE

COMPANY NAME TEXAS DEPT OF AGRICULTURE

SUBMISSION PURPOSE REVIEW NEW INFORMATION ON PREVIOUSLY
REVIEWED SECTION 18

_____

COMMON CHEMICAL NAME _____

REVIEWER: Mike Reynolds

Ecological Effects Branch

100.1 Submission Purpose

The Texas Department of Agriculture is requesting an emergency exemption (Section 18) for the use of esfenvalerate (ASANA XL) on leafy greens to control cabbage looper.

100.2 Application Rate/Methods/Directions

Esfenvalerate may be applied at the maximum rate of 0.05 lb ai/A per application (3 applications are to be made). A maximum of 1500 acres of leafy vegetable greens may be treated.

100.4 Precautionary Labeling

This pesticide is toxic to wildlife and extremely toxic to fish. Use with care when applying in areas adjacent to any body of water. Do not apply directly to water. Do not apply when weather conditions favor drift from treated areas. Do not contaminate water by cleaning of equipment or disposal of wastes. Apply this product only as specified on this label.

101.0 Hazard Assessment

The State of Texas is requesting an emergency exemption for the use of ASANA on leafy vegetables greens to control cabbage loopers. This section 18 calls for a maximum application of 0.05 lb ai/A, three times per season, on 1500 acres of land.

Aquatic Toxicity

Fenvalerate, a second generation pyrethroid, degrades in soil with a half-life of six months and undergoes hydrolysis after 24 days at ph 7.2. Fenvalerate can strongly bind to sediment/particulate and result in a soil/water partition coefficient of greater than 15,000. Fenvalerate is a neurotoxicant and effector of ion permeability, (Miller and Adams 1982) and may interact with sodium gates (Lawrence and Casida 1983). Laboratory testing has shown that fenvalerate is very highly toxic to freshwater aquatic organisms as noted

in acute toxicity values that ranged from 0.032 ug/L (Daphnia magna) to 2.35 ug/L (fathead minnow) (Mayer and Ellersieck 1986). This very high toxicity has also been documented in acute marine studies. Schimmel et al. (1983) found that fenvalerate was acutely toxic to mysid shrimp, Mysidopsis bahia at 0.008 (0.005 - 0.01) ug/L and pink shrimp, Penaeus duorarum at 0.84 (0.66 - 1.2) ug/L. They further found that acute toxicity values for estuarine fish ranged from 5.0 (0.55 - 5.3) ug/L sheepshead minnow, Cyprinodon variegatus, and 0.31 (0.21 - 0.40) ug/L for Atlantic silversides, Menidia menidia.

An evaluation of sublethal fenvalerate exposure to aquatic invertebrate larval development and metabolism was conducted by McKenney and Hamaker (1984). They concluded that exposure to 0.0001 and 0.0002 ug/L can result in alterations of metabolic-salinity patterns of larval grass shrimp, Palaemonetes pugio. This effect reduces the homeostasis at a critical life stage by limiting the organisms capacity to adapt to fluctuating salinity conditions that are normally encountered in estuarine waters.

An assessment of the potential environmental risk of a pesticide must include actual or estimated values of exposure. Smith et al. (1983) noted that fenvalerate concentrations in runoff from a sugarcane-insect IPM system could present a toxicity problem to aquatic organisms. Although the toxicity of fenvalerate may be reduced as a result of sorption to sediment, Coulon (1982) found that this reduction was only 2-fold, and does not eliminate aquatic hazard.

The Ecological Effects Branch (EEB) has calculated estimated environmental concentrations (EEC) of ASANA residues on leafy greens following ground and aerial application (Appendix I). These calculations suggest that at 0.05 lb ai/A, the EEC for ASANA from both types of application are 0.03 and 0.15 ug/L, respectively. A comparison of these estimates with our Regulatory Criteria suggests that ASANA use on leafy greens could result in environmental residues that exceed aquatic toxicity concerns via runoff and drift from sprayed fields that are adjacent to aquatic systems.

Avian Toxicity

The available data suggests that fenvalerate is practically non-toxic to birds at an acute level (mallard LC_{50} = 9,932 ppm; Bobwhite quail LC_{50} = 10,000 ppm). However, avian

3

reproductive effects were found at 25 ppm. In assessing acute toxicity of ASANA to avian wildlife, EEB has estimated the potential avian exposure from residues by using Hoerger and Kenaga (1972) table of typical maximum residues on differing categories of vegetation (Table 1).

Table 1: Maximum Expected Fenvalerate Residues on Avian Food and Dietary Intake (ppm) after an Application of 0.05 lb ai/A on Leafy Greens

Food Type	Residue (ppm)
Short grass	12.0
Dense Foliage/Small Insects	2.7
Large Insects	0.6

The maximum expected residues from the consumption of vegetation and insects (application rate of 0.05 lb ai/A) are expected to range from 0.6 to 12.0 ppm. These values show that ASANA use on leafy greens should not present a direct toxicity threat to birds (expected residues are 6 to 3 orders of magnitudes less than acute and chronic toxicity values). However, the high toxicity of ASANA to aquatic invertebrates and the possibility of exposure to aquatic environments from runoff and drift can result in an indirect effect to waterfowl recruitment by impacting a significant food base.

101.2 Endangered Species

The use of esfenvalerate could affect four threatened or endangered plants, by eliminating certain pollinators on which these plants depend for propagation. The counties and plants are listed as follows:

Counties	Endangered Plant
Uvalde =	Ancistrocatus tobuschi; Styrax texana
Starr =	Thymophyla tephrolenca Frankenia johnstoni

107.0 Conclusions

EEB has completed its evaluation of this Section 18 request for the use of ASANA on leafy greens in Texas. Expected EEC values were calculated in order to assess the potential hazards of ASANA to avian and aquatic species. The expected residues from field runoff and

drift exceed acute/chronic toxicity values by one to two orders of magnitude. However, because of the proposed very low acreage(1,500 acres), this use of ASANA is expected to have a minimal impact to nonendangered fish and wildlife because of the limited exposure.

However, the elimination of pollinators on which certain endangered plants depend for propagation could be affected by esfenvalerate contact. In order to protect endangered or threatened species in the counties to be sprayed, EEB contacted the department of Fish and Wildlife in Texas. Rogelio Perez, field supervisor, recommends against the application of this pesticide in the highlighted areas (figure 1 and 2) of Starr and Uvalde Counties, and also suggests that this pesticide should not be sprayed by air in a 1/4 mile buffer zone along the external border of these designated areas.

Miachel Rexrode 3/17/92

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Environmental Fate & Effects Division (H7507C)

5

Appendix I: EEC Calculations for ASANA Use on Leafy Greens

1) Ground Application

Assumptions

0.1% runoff

10 acre drainage basin

0.05 lb ai/A

Runoff

0.05 lb ai/A x 0.001 x 10 A = 0.0005 lb ai total runoff

EEC of 1 lb ai, direct application to 1 A pond

6 ft deep = 61 ug/L

Therefore: $EEC = \frac{61 \text{ ug/L}}{1 \text{ lb ai}} \times \frac{0.0005 \text{ lb ai}}{1} = 0.03 \text{ ug/L}$

II. Aerial Application

Assumptions:

0.1% runoff

60% application efficiency

10 acre drainage basin

5% drift

0.05 lb ai/A

Runoff

0.05 lb ai/A x 0.6 x 0.0001 x 10 A = 0.00003 lb ai in runoff

Drift

0.05 lb ai/A x 0.05 = 0.0025 lb ai in drift

Therefore, $EEC = \frac{61 \text{ ug/L}}{1 \text{ lb ai}} \times \frac{0.0025 \text{ lb ai}}{1} = 0.15 \text{ ug/L}$

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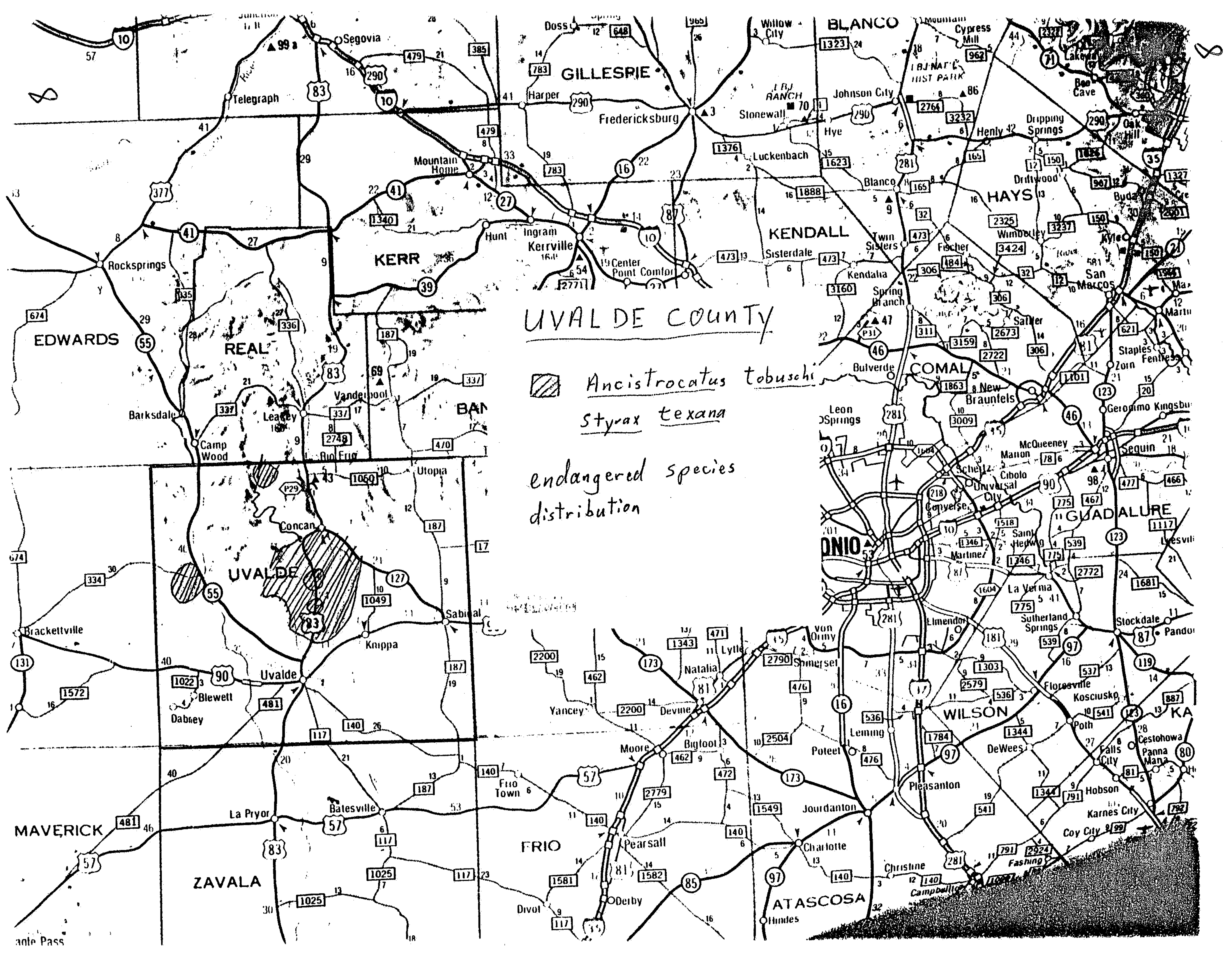
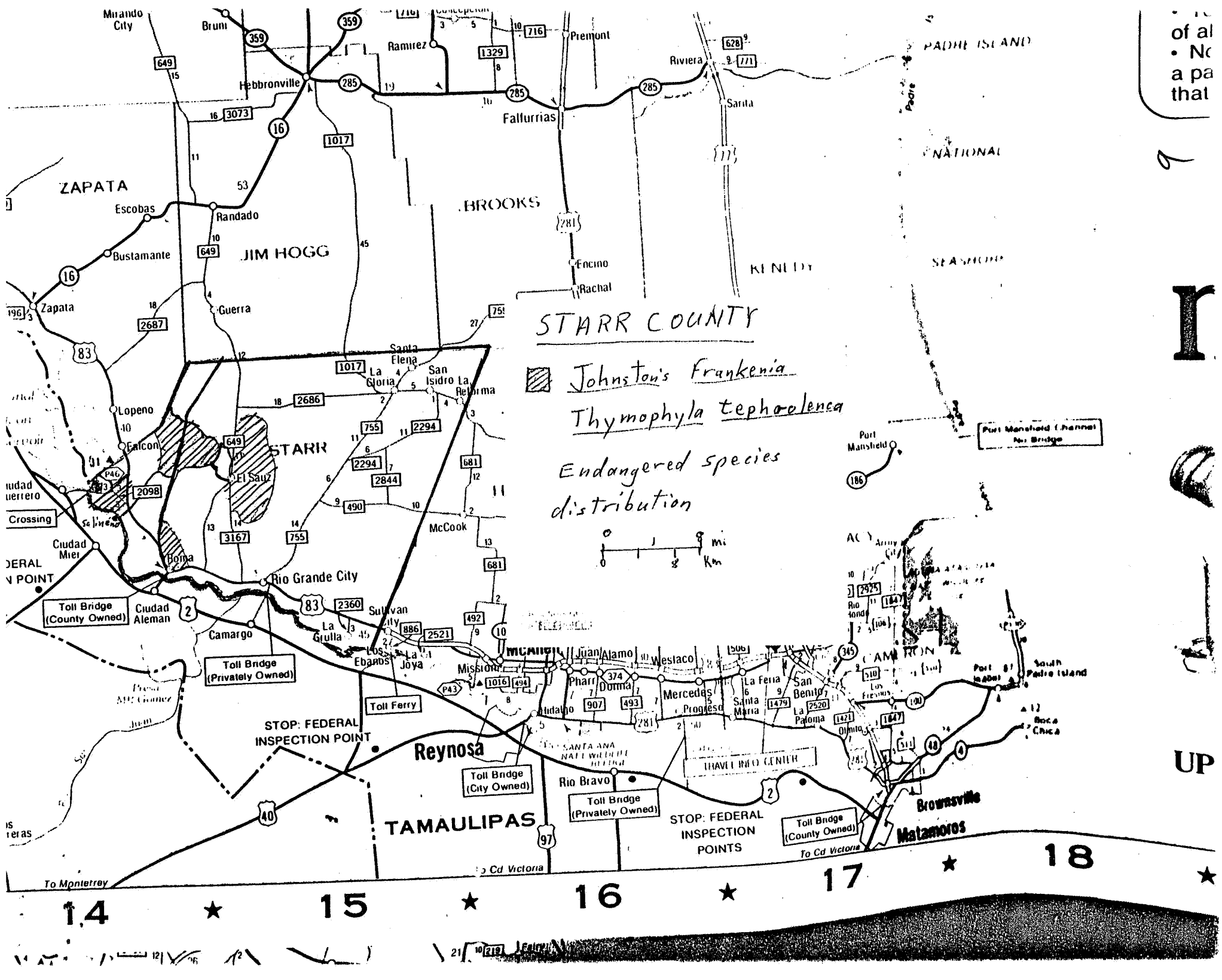

UVALDE COUNTY
Ancistrocactus tobuschi
Styrax texana
endangered species distribution
EDWARDS
REAL
KERR
GILLESPIE
BLANCO
KENDALL
HAYS
COMAL
GUADALUPE
UVALDE
MAVERICK
ZAVALA
FRIO
ATASCOSA
WILSON


STARR COUNTY
Johnston's Frankenia
Thymophyla tephroleuca
Endangered species
distribution
0 1 2 mi
0 1 2 Km
ZAPATA
JIM HOGG
BROOKS
KENEDY
STARR
TAMAULIPAS
Mirando City
Bruni
Hebbronville
Ramirez
Premont
Riviera
Falfurrias
Sarita
Escobas
Randado
Bustamante
Zapata
Guerra
Encino
Rachal
Santa Elena
La Gloria
San Isidro
La Reforma
Lopeno
Falcon
El Sauz
McCook
Port Mansfield
Port Mansfield Channel
Ciudad Miguel Alemán
Roma
Rio Grande City
Ciudad Aleman
Camargo
La Grulla
Sullivan City
Los Ebanos
La Joya
Mission
McAllen
Juan Alamo
Weslaco
Pharr
Donna
Mercedes
Progreso
La Feria
Santa Maria
San Benito
La Paloma
Olmito
Port Isabel
South Padre Island
Boca Chica
Brownsville
Matamoros
Reynosa
Rio Bravo
Toll Bridge (County Owned)
Toll Bridge (Privately Owned)
Toll Ferry
Toll Bridge (City Owned)
STOP: FEDERAL INSPECTION POINT
STOP: FEDERAL INSPECTION POINTS
TRAVEL INFO CENTER
SANTA ANA NATL WILDLIFE REFUGE
To Monterrey
To Cd Victoria
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