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GRAY RANCH: FIRE AND BUTTERFLIES IN SOUTHWESTERN NEW MEXICO

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ABSTRACT.– Conservation management at the Gray Ranch, in southwestern New Mexico (Hidalgo Co.), is summarized. Fire is a significant aspect of the natural ecosystem of the Gray Ranch area. Butterflies of the Gray Ranch region are noted and some are illustrated.

KEY WORDS: conservation, Danaidae, ecology, Hesperiidae, Libytheidae, Lycaenidae, Megathymidae, Mexico, New Mexico, Nymphalidae, Papilionidae, Pieridae, range management, Riodinidae, Satyridae.

Since 1990, the popular print media have devoted a lot of space to the Gray Ranch, a conservation project of ecosystem magnitude currently taking shape in the "bootheel" of southwestern New Mexico. Gray Ranch managers are very interested in enhancing understanding of natural ecosystems within their domain and Lepidoptera as a group are of special interest here.

GRAY RANCH ECOSYSTEM

The Gray Ranch includes about 500 square miles of land bisected by the Continental Divide. Most is privately owned, but large areas are leased from the U. S. Bureau of Land Management, the New Mexico State Land Office, or other private land owners. The Ranch includes an ocean of high valley grassland at 5000 ft (1500m) elevation surrounding a mountain island rising to 8500 ft (2600m) elevation. Grasslands here consist of more than 50 species of grasses. The Animas Mountains are covered by deciduous and evergreen oaks, alligator juniper, Mexican pinon pine, ponderosa pine and douglas fir. Key riparian areas support woodland corridors of cottonwood, willow and sycamore. Lowlands around the mountains are internally drained; streams and creeks discharge to playas.

This area is not a desert. Winter precipitation is sufficient to support a strong spring flight of about 70 species of butterflies. The summer "monsoon" season creates a second, and greater, moist period. Afternoon thunderstorms in July and August bring enough rain to green up the summer grasses cloaking the hills. Occasionally, thunder storms spawn memorable flash floods. During this moist, warm period most resident butterflies have their principal flight, and many subtropical transient species enter the area on southerly air flow.

It is dry in May and June, though, when winds blow relentlessly from the Sonoran and Mojave Deserts to the west. Relative humidity sinks toward 5 percent, and daytime temperatures approach 100°F. Fire typically comes in mid-June, near the end of the dry season when vegetation is parched and the first embryonic thunderstorms are starting to form in the sky. The first storms generate plenty of lightning, but little rain. Once ignited, natural fires may burn until later rain douses them.

Fig. 1. General habitat of Gray Ranch, Hidalgo Co., New Mexico.

CONSERVATION ISSUES

Fire is a fundamental component of the ecosystem in this area, but for many years people controlled fires. In the short term, fires burn forage, and this year's livestock cannot live on burnt pasture, or on the promise of better forage next year. In ranching, as in some other commercial enterprises, future planning is often sacrificed for short-term profits. Even when individual ranchers appreciated the advantages of occasional fires, they too often found themselves in a financial position in which they were unable to wait out a year with no financial return, had to feed and sell their livestock, and thus could not let their land rest or burn. Well-meaning government agencies have long cooperated by fighting range and forest fires. Signs urging one and all to "Prevent Range Fires" still are common in New Mexico.

Under the leadership of local rancher Drum Hadley, and assisted by his family and other local cattlemen, the Animas Foundation was formed. This group aims to change the status quo and

Fig. 2-21. Butterflies at Gray Ranch (photographs not all taken at Gray Ranch): **2**) *Junonia nigrosuffusa* Barnes & McDunnough (Nymphalidae), Chiricahua Mts., Cochise Co., AZ; **3**) *Limenitis arthemis arizonensis* (W. H. Edwards) (Nymphalidae), Animas Mts., Hidalgo Co., NM; **4**) *Amblyscirtes exoteria* (Herrich-Schäffer) (Hesperiidae), Animas Mts., Hidalgo Co., NM; **5**) *Gyrocheilus patrobas tritonia* (W. H. Edwards) (Nymphalidae), Chiricahua Mts., Cochise Co., AZ; **6**) *Emesis ares* (W. H. Edwards) (Riodinidae), Chiricahua Mts., Cochise Co., AZ ; **7**) *Thessalia theona thekla* (W. H. Edwards) (Nymphalidae), Guadalupe Cyn., Hidalgo Co., NM; **8**) *Cogia caicus* (Herrich-Schäffer) (Hesperiidae), Animas Mts., Hidalgo Co., NM; **9**) *Euphilotes rita rita* (Barnes & McDunnough) (Lycaenidae), Gray Ranch, Hidalgo Co., NM; **10**) *Erora quaderna sanfordi* dos Passos (Lycaenidae), Cooke's Range, Luna Co., NM; **11**) *Pyrrhopyge araxes arizonae* Godman & Salvin (Hesperiidae), Animas Mts., Hidalgo Co., NM; **12**) *Everes comyntas* (Godart) (Lycaenidae), Mogollon Cr., Grant Co., NM; **13**) *Euphydryas anicia hermosa* (W. G. Wright) (Nymphalidae), Big Pine Cyn., Catron Co., NM; **14**) *Neophasia terlootii* Behr (Pieridae), Chiricahua Mts., Cochise, Co., AZ; **15**) *Kricogonia lyside* (Godart) (Pieridae),

bring fire back to this country. They intend to make the Gray Ranch an example of how proper range management, mixed with some new ideas, can benefit ranchers as well as conservation interests. After all, healthy grasslands are in the best interest of both groups. Many, but not all, area ranchers support Hadley's efforts to discard old ways of thinking. They want to bring about a healthy ecosystem, and they are willing to take a chance and work with conservation groups to do it.

Credit the Nature Conservancy (TNC) with the wisdom and foresight to see that it was simply not possible to lock up 500 square miles as a wildlife preserve. TNC purchased the Gray Ranch in 1990 as a centerpiece of its worldwide Last Great Places initiative. The idea of an uncompromised refuge has much philosophical appeal to conservationists. But on a planet where most habitable land is already under human use, a parcel as large as the Gray cannot be fenced and isolated from the local community and its well-being. TNC saw that it did not have to be, and that there was value in working with the local residents. TNC and the Animas Foundation are now working together to achieve a shared goal.

What does this mean for the area's native, non-human inhabitants? It means a continued opportunity to exist in their natural condition, with few constraints placed upon them by people. This applies to the rare and endangered, the cute and the cuddly, mountain lion and javelina, zone-tailed hawk and ridge-nosed rattlesnake. It also applies to the legions of unnoticed and unsung heroes of proper ecosystem functioning—grasshoppers and butterflies, for example.

BUTTERFLIES

Because of their relative isolation, the Gray Ranch and Animas Mountains do not have a long history of lepidoptera study. With the exception of a 1960 report of *Megathymus ursus* (Wielgus, *et al*, 1973), the oldest reports known to the authors date from the early 1970s. Although peripheral to his main study area along the Mogollon Rim to the north, Ferris (1976) reported about 10 butterfly species from the Animas River valley, which is immediately west of the Animas Mountains and on or near the Gray Ranch. A state-sponsored biological survey in the area reported on many different kinds of animals, and tallied more than 30 butterfly species (Hubbard, 1977). Reports of transient lepidopterists who made observations in the area between 1970 and 1975 are reported in Toliver ([1991]). The butterfly fauna across the border in southeastern Arizona is very similar, and is historically better studied and better documented (Bailowitz and Brock, 1991).

The Gray Ranch today supports more than 130 species of butterflies, most as breeding residents (see Table 1). Situated at the northern limit of the Sierra Madrean floristic province and the southern limit of Rocky Mountain influences from the north, the Animas Mountains and similar ranges to the west (Chiricahuas and Huachucas) support species and communities which are represented nowhere else in the United States or in the world. Where else can you go to see *Neophasia terlootii* Behr, eight species of *Amblyscirtes*, and five species of *Atrytonopsis*? The Ranch supports one of the few United States colonies of the skipper, *Adopaeoides prittwitzi* (Plötz).

Although the historical data base is too limited to allow quantitative analysis, qualitative comparisons are quite useful. For example, *Epargyreus clarus* (Cramer) and *Papilio rutulus* (Lucas) were apparently present in the Animas Mountains in the 1970s (Hubbard, 1977). In four recent years of survey work by the author, 1990-1994, neither species has been seen. In 1989, a tremendous fire burned 40,000 acres, including much of the high country where these species probably had their core habitat. With continued periodic monitoring of populations, scientists will be able to evaluate long-term stability of these and other species in the area.

CONCLUSIONS

It is easy to jump to the conclusion that fire should be eliminated to protect certain species. But fire is a fact of life in these areas and all life forms adapt one way or another, even if that means occasional extirpation of peripheral colonies. Many years of artificial fire suppression may cause dangerous accumulations of fuel. When a mountain of kindling catches fire, the result may be worse than any fire that could have occurred under natural conditions.

Allowing little fires to burn on a regular basis, on the other hand, should discourage big fires from occurring and doing major damage. Little fires do little damage and usually leave many unburned pockets within the fire zone. A small burn occurred along Deer Creek in the southern Animas Mountains in June 1993. It looked pretty bad in July, but by October most burned areas were revegetating. Many native plants, which are fire-adapted, were sprouting again from undamaged roots. Resprouting of *Nolina* sp. and *Yucca* sp. were amazingly beautiful and almost instantaneous.

The Gray Ranch presents a unique opportunity to do conservation right on a grand scale. Those involved hope it can serve as an example for ecosystem preservation projects in other lands.

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Guadalupe Cyn., Hidalgo Co., NM; **16**) *Amblyscirtes oslari* (Skinner) (Hesperiidae), Black Mesa St. Pk., Cimarron Co., OK; **17**) *Eurema boisduvalianum* (C. Felder & R. Felder) (Pieridae), Animas Mts., Hidalgo Co., NM; **18**) *Atrytonopsis python* (W. H. Edwards) (Hesperiidae), Organ Mts., Doña Ana Co., NM; **19**) *Agathymus aryxna* (Dyar) (Hesperiidae), Peloncillo Mts., Hidalgo Co., NM; **20**) *Amblyscirtes nereus* (W. H. Edwards) (Hesperiidae), Animas Mts., Hidalgo Co., NM; **21**) *Anthocharis cethura pima* W. H. Edwards (Pieridae), Gray Ranch, Hidalgo Co., NM.

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TABLE 1. LIST OF GRAY RANCH BUTTERFLIES

This list names Gray Ranch species by family. Following the name and author, the residency status and flight period at Gray Ranch are noted.

HESPERIIDAE

Pyrrhopyge araxes arizonae Godman & Salvin. Resident. Jun, Aug-Sep.
Epargyreus clarus huachuca Dixon. Extirpated? May.
Zestusa dorus (W. H. Edwards). Resident. Apr.
Urbanus dorantes dorantes (Stoll). Occasional resident. Sep-Oct.
Autochton cellus (Boisduval & LeConte). Resident. Jul-Aug.
Achalarus casica (Herrich-Schaffer). Transient. Jul-Aug.
Thorybes pylades (Scudder). Resident. Jun-Aug.
T. drusius (W. H. Edwards). Occasional resident. Aug.
Cogia hippalus (W. H. Edwards). Resident. Jun-Aug.
C. caicus moschus (W. H. Edwards). Resident. Apr-May, Jul-Aug.
Staphylus ceos (W. H. Edwards). Resident. Mar-May, Jul-Sep.
Systasea zampa (W. H. Edwards). Resident. Apr, Jul-Aug.
Erynnis brizo burgessi (Skinner). Resident. Apr.
E. juvenalis clitus (W. H. Edwards). Resident. Mar-May, Jul-Aug.
E. meridianus Bell. Resident. Apr, Aug.
E. tristis tatius (W. H. Edwards). Resident. Mar-May, Jul-Sep.
E. pacuvius pacuvius (Lintner). Resident. Apr, Jul-Aug.
E. funeralis (Scudder & Burgess). Seasonal resident. Apr-Oct.
E. afranius (Lintner). Resident. Apr.
Pyrgus scriptura (Boisduval). Resident. Aug.
P. communis (Grote) complex. Resident. Mar-Oct.
P. oileus (Linnaeus). Occasional resident. Apr.
P. philetas W. H. Edwards. Resident. Apr, Jun-Jul, Sep-Oct.
Celotes nessus (W. H. Edwards). Resident. Apr, Jul-Aug.
Pholisora catullus (Fabricius). Resident. Apr-Sep.
Oarisma edwardsii (Barnes). Resident. Jul-Aug.
Copaeodes aurantiacus (Hewitson). Resident. Apr-Oct.
Adopaeoides prittwitzi (Plötz). Resident. May-Jun, Sep.
Hylephila phyleus (Drury). Resident. Aug-Oct.
Yvretta carus carus (W. H. Edwards). Resident. Aug.
Hesperia pahaska (Leussler). Resident. Apr-May, Aug-Oct.
H. viridis (W. H. Edwards). Resident. Jul.
Atalopedes campestris campestris (Boisduval). Resident. Jul.
Poanes melane vitellina (Herrich-Schäffer). Resident. May, Sep.
Atrytonopsis deva (W. H. Edwards). Resident. Apr-May.
A. lunus (W. H. Edwards). Resident. Aug.
A. vierecki (Skinner). Resident. May.
A. pittacus (W. H. Edwards). Resident. Apr.
A. python python (W. H. Edwards). Resident. May.
A. simius W. H. Edwards. Unconfirmed report. Aug.
Amblyscirtes exoteria (Herrich-Schäffer). Resident. Jul-Aug.
A. cassus W. H. Edwards. Resident. Jun-Aug.
A. aenus W. H. Edwards. Resident. Jul-Aug.
A. oslari (Skinner). Resident. Apr.
A. texanae Bell. Resident. Jun-Aug.
A. nereus (W. H. Edwards). Resident. Jul-Aug.
A. nysa W. H. Edwards. Resident. Jul-Aug.
A. eos (W. H. Edwards). Resident. Apr-May, Jul-Sep.

MEGATHYMIDAE

Agathymus aryxna (Dyar). Resident. Sep-Oct.
A. polingi (Skinner). Unconfirmed report.
Megathymus yuccae arizonae Tinkham. Resident. Mar-Apr.
M. ursus ursus Poling. Resident. Jul.

PAPILIONIDAE

Battus philenor (Linnaeus). Resident. Apr-Sep.
Papilio polyxenes asterius Stoll. Resident. Mar-Sep.
Papilio rutulus arizonensis W. H. Edwards. Extirpated? Jun.
P. multicaudatus (W. F. Kirby). Resident. Apr-Aug.
Heraclides cresphontes (Cramer). Transient. Jun-Aug.

PIERIDAE

Neophasia terlootii Behr. Unconfirmed report.
Pontia sisymbrii sisymbrii (Boisduval). Resident. Mar-Apr.
P. protodice (Boisduval & LeConte). Resident. Apr-Sep.
Pieris rapae (Linnaeus). Resident. Apr.
Euchloe hyantis lotta Beutenmuller. Resident. Mar-Apr.
Anthocharis cethura pima (W. H. Edwards). Resident. Mar-Apr.
A. sara inghami Gunder. Resident. Mar-Apr.
Colias philodice Godart. Resident. Mar-Apr, Jun, Sep.
C. eurytheme Boisduval. Resident. Mar-Oct.
Zerene cesonia cesonia (Stoll). Seasonal resident. Mar-May, Aug-Oct.
Anteos clorinde nivifera (Fruhstorfer). Transient. Jul-Aug.
A. maerula (Fabricius). Transient. Aug.
Phoebis sennae (Linnaeus). Seasonal resident. Apr, Aug-Oct.
P. agarithe agarithe (Boisduval). Seasonal resident. Aug.
Kricogonia lyside (Godart). Seasonal resident. Sep.
Eurema boisduvalianum (C. & R. Felder). Seasonal resident. Jun-Sep.
E. mexicanum (Boisduval). Resident. Apr-May, Aug-Oct.
E. proterpia (Fabricius). Seasonal resident. Aug-Oct.
E. nise nelphe (R. Felder). Seasonal resident. Jun-Jul.
E. nicippe (Cramer). Resident. Mar-Oct.
Nathalis iole Boisduval. Resident. Mar-Oct.

LYCAENIDAE

Atlides halesus (Cramer). Resident. Mar-May, Aug-Sep.
Phaeostrymon alcestis oslari (Dyar). Resident. May-Jun.
Ministrymon leda (W. H. Edwards). Resident. Apr-Sep.
Mitoura grynea siva (W. H. Edwards). Resident. Apr-May.
Incisalia augustus annettae dos Passos. Resident. Mar-May.
Strymon melinus Hubner. Resident. Mar-Oct.
Erora quaderna sanfordi dos Passos. Resident. Mar-Apr, Jul-Aug.
Brephidium exile (Boisduval). Resident. Apr-Oct.
Leptotes marina (Reakirt). Resident. Mar-Oct.
Hemiargus ceraunus gyas (W. H. Edwards). Resident. Aug-Oct.
H. isola alce (W. H. Edwards). Resident. Mar-Oct.
Everes comyntas (Godart). Resident. Mar-Oct.
Celastrina argiolus (Linnaeus). Resident. Mar-Oct.
Euphilotes rita rita (Barnes & McDunnough). Resident. Aug-Sep.
Plebejus acmon texana Goodpasture. Resident. Mar-Oct.

RIODINIDAE

Calephelis nemesis nemesis (W. H. Edwards). Resident. Jun-Oct.
C. rawsoni arizonensis (McAlpine). Resident. Jun, Sep-Oct.
Emesis zela cleis (W. H. Edwards). Resident. Mar-Apr, Jul-Sep.
E. ares (W. H. Edwards). Resident. Jul-Sep.
Apodemia mormo (C. & R. Felder). Resident. Apr-May, Aug-Oct.
Apodemia palmerii (W. H. Edwards). Seasonal resident. May.

LIBYTHEIDAE

Libytheana bachmanii (Kirtland). Seasonal resident. Apr-Oct.

NYMPHALIDAE

Agraulis vanillae incarnata (Riley). Transient. Apr, Sep.
Euptoieta claudia (Cramer). Resident. Mar-Oct.
Thessalia theona thekla (W. H. Edwards). Resident. Apr-Sep.
T. fulvia (W. H. Edwards). Resident. Apr-Aug.
Chlosyne lacinia crocale (W. H. Edwards). Resident. Apr-Oct.
Dymasia dymas chara (W. H. Edwards). Resident. Apr-May, Aug-Sep.
Texola elada perse (W. H. Edwards). Resident. May-Sep.
Phyciodes texana (W. H. Edwards). Resident. Mar-Sep.
P. vesta (W. H. Edwards). Transient. Oct.
P. tharos (Type A) (Drury). Resident. Apr-Oct.
P. pictus (W. H. Edwards). Resident. Jul-Sep.
P. mylitta (W. H. Edwards). Resident. Mar-May, Sep-Oct.
Euphydryas anicia hermosa (W. G. Wright). Resident. Mar-Apr.
Polygonia satyrus (W. H. Edwards). Resident. Mar-Apr, Jun-Oct.
Nymphalis antiopa (Linnaeus). Resident. Mar-Oct.
Vanessa cardui (Linnaeus). Resident. Mar-Oct.
V. virginiensis (Drury). Resident. Mar-Oct.
V. annabella (Field). Resident. Apr-May, Aug-Oct.
V. atalanta (Linnaeus). Resident. Mar-Apr, Aug-Oct.
Junonia coenia Hübner. Seasonal resident. May-Oct.
J. evarete nigrosuffusa (Barnes & McDunnough). Seasonal resident. May-Oct.
Limenitis arthemis arizonensis (W. H. Edwards). Resident. May-Oct.
L. archippus obsoleta (W. H. Edwards). Resident. Jun-Oct.
Adelpha bredowii Geyer. Resident. May-Jun, Aug-Oct.
Mestra amymone (Ménétriés). Transient. Oct.
Anaea andria Scudder. Resident. Oct.
Asterocampa celtis montis (W. H. Edwards). Resident. May, Aug-Sep.
A. clyton texana (Skinner). Resident. Aug-Sep.

SATYRIDAE

Cyllopsis pertepida dorothea (Nabokov). Resident. Apr-Oct.
Megisto rubricata cheneyorum (R. Chermock). Resident. May-Aug.
Cercyonis meadii mexicana R. Chermock. Resident. Aug.
Gyrocheilus patrobas tritonia (W. H. Edwards). Resident. Sep-Oct.

DANAIDAE

Danaus plexippus (Linnaeus). Seasonal resident. Mar-May, Jul-Oct.
D. gilippus strigosus (Bates). Resident. Mar-Oct.