The Texas Parks and Wildlife Department Central Coast Wetland Ecosystems Project: A New Approach at Integrating Nongame Interests with Existing Game Management Programs

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Abstract: The Texas Parks and Wildlife Department Wildlife Division is proposing to establish regional "wetland ecosystem" teams to coordinate wetland related activities on state-owned and private lands in Texas. The Central Coast Wetland Ecosystems Project (CCWEP) was the first of these teams to form. Project staff are responsible for daily management, maintenance, and research activities on state-owned areas, as well as providing management assistance to private landowners and coordinating surveys for American alligators (*Alligator mississipiensis*) and colonial waterbirds on the central Texas coast. CCWEP staff will employ traditional and innovative land management practices, primarily for waterfowl. Ecosystem monitoring, however, will be aimed primarily at documenting the response of vegetation, neotropical birds, small mammals, reptiles, amphibians, and fish-to-game management practices. Monitoring will involve the use of Sherman live traps, drift fence arrays, point counts, point intercept transects, bag seines, and trammel nets. To date, 22 small mammal species, 301 bird species, 43 reptile and amphibian species, and 53 fish species have been documented. Monitoring and research will also assess species composition and distribution by season and habitat type.

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Increasing concern over loss of critical coastal wetland habitat and its effect on wetland dependent species has magnified the importance of devoting adequate resources to fully understanding coastal wetland ecosystem functions.

Texas Parks and Wildlife Department (TPWD) Wildlife Division recently initiated a new approach to wetland management and research. TPWD will form several regional "wetland ecosystem" teams to coordinate TPWD wetland related activities with other agencies, private landowners, and conservation groups. The Central Coast Wetland Ecosystems Project (CCWEP), which encompasses an area from Galveston Bay to Corpus Christi Bay and extending inland approximately 40 miles (Fig. 1) was the first of these teams to form. Included in the project area are approximately 25,000 acres of TPWD owned or leased lands comprised of Peach Point Wildlife Management Area (WMA) (4,170 ha) in Brazoria County, Mad Island WMA (2,900 ha) in Matagorda County, Guadalupe Delta WMA (2,230 ha) in Calhoun County, Redhead Pond WMA (16 ha) in Nueces County, and Welder Flats Coastal Preserve (600 ha) in Calhoun County. The staff is comprised of a project leader, 3 conservation scientists, and 3 fish and wildlife technicians.

CCWEP staff are responsible for daily management, maintenance, and research activities on state-owned WMAs. CCWEP staff will provide Private Lands Enhancement assistance to land managers and conservation organizations. CCWEP staff have regulatory responsibilities for the American alligator and conduct waterfowl and colonial waterbird surveys.

The CCWEP goal is to provide for sound biological conservation of all

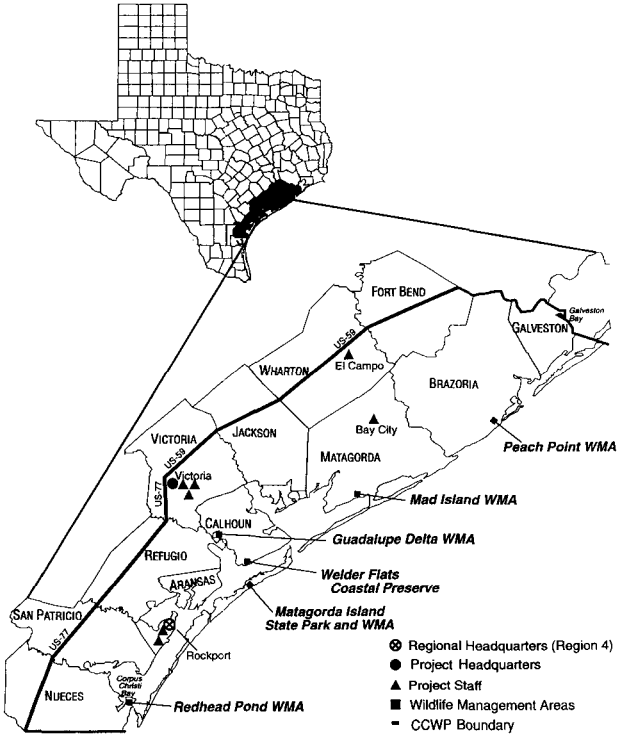

Figure 1. Locations of wildlife management areas, project staff, and regional and project headquarters within the Texas Parks and Wildlife Department Central Coast Wetlands Ecosystem Project area.

wildlife resources within the central coast of Texas. To aid in the achievement of that goal, the following objectives have been established:

1. Develop and manage habitats for indigenous and migratory species inclusive of endangered species and neotropical migrants with special emphasis on waterfowl.
2. Expand and improve WMA facilities to accommodate research and management activities that will allow for a complete understanding of coastal ecosystem functions.
3. Formulate research and management activities on WMA and private lands that can be used as outdoor classrooms and demonstration projects to benefit private landowners, resource agencies, and schools.
4. Disseminate ecological and management information to resource agencies, scientific groups, land managers, conservation groups, and schools through publications (technical manuscripts, species checklists, management bulletins) and presentations.
5. On state-owned lands provide optimum public recreational opportunity, compatible with the resource and available staff, such as hunting, bird watching, and ecological tours/workshops, that will further the public's understanding of ecosystem functions and components.

Habitat Management

Intensive management practices are necessary to combat habitat degration and to optimize biodiversity of remaining wetland habitats. Habitat management activities on state-owned and private lands in the CCWEP project area are aimed primarily at providing quality habitat for wintering and resident waterfowl. Habitat management techniques include: regulated grazing, controlled burning, impoundment construction and water level management, mechanical and chemical control of vegetation, and placement of grit.

CCWEP personnel recognize and support the use of grazing as a natural, necessary,and cost effective management tool (Kozicky and Fulbright 1991). CCWEP personnel have worked with Soil Conservation Service personnel in developing specific rotational grazing plans and stocking rates for each WMA. A rotational system (Holechek 1983) gives the land-manager control over grazing pressure, thereby creating a mosaic of beneficial habitat conditions. All grazing lease agreements are prepared by CCWEP staff to ensure complete control of the grazing operation.

Fire is a natural phenomena that has influenced community dynamics throughout the world (Wright and Bailey 1982, Higgins 1986). Controlled burns can be used to manage several hundred to thousands of acres for only pennies per acre. The benefits of a burn usually last 2–3 years, after which vegetation becomes coarse and less nutritive and noxious vegetation invades. CCWP WMA's are operating under a 3-year rotation burn plan, whereby specific management compartments are burned every third year. Burn plans will vary by

management unit. For example, some management units will be subjected to fall/winter burns to provide foraging areas for wintering waterfowl and shorebirds, whereas burn plans in other units will utilize growing season burns to control invading brush and promote native tallgrasses. Specific burning plans have been developed for each WMA and will be coordinated with the grazing program.

Drainage, urbanization, and saltwater intrusion have modified and destroyed much of the extensive natural coastal marsh on the Gulf Coast (Tiner 1984). Wetland development and aggressive management is necessary to reverse this trend (Chabreck et al. 1989, Stutzenbaker and Weller 1989). CCWEP personnel are actively pursuing many avenues of funding for wetland development/management projects. Specifically, personnel are involved in developing proposals for funding through Coastal Wetland Grants, Gulf Coast Joint Venture of the North American Waterfowl Management Plan, Ducks Unlimited MARSH program, and mitigation. Overall, the management plan will promote the conservation of brackish and intermediate marshes along the Texas Gulf Coast.

Mechanical (mowing, discing) and chemical (herbicides) control of vegetation is used to complement other management techniques, and is also used in areas where other techniques cannot be employed. TPWD use of pesticides follows guidelines established by TPWD Resource Protection Branch in coordination with Texas Department of Agriculture regulations.

Grit sites will be used to improve and maintain high waterfowl use, especially by geese, and to improve the distribution of waterfowl within managed areas. Grit sites will also provide locations where large numbers of waterfowl can be trapped for banding or other scientific purposes. Large scale plantings will not be conducted on natural habitats. Japanese millet (*Echinocloa crusgalli*) may be seeded in developed impoundments to provide a forage base for waterfowl. Cereal crops may be "share-cropped" in certain areas to provide waterfowl food or to accommodate research and demonstration activities. Rye grass will be seeded on some upland sites to provide forage for geese and to improve goose distribution within managed areas. Shallow discing may be used to promote establishment of green forage during winter.

Ecosystems Monitoring

The overwhelming majority of wildlife species found on these WMA's are nongame species. Game species have historically received priority attention in any habitat development, monitoring, or research programs; however, in the new wave of "holistic resource management" and "ecosystem approaches," it is necessary to recognize the need to gather data on the effects that habitat manipulations for game species have on nongame species and plant communities. Monitoring the effects of on-going management activities is necessary to understand the effects on non-game species, and to determine if modification of game management practices are necessary. The ecosystems monitoring approach of the CCWEP will emphasize nongame wildlife species and plant com-

munities. Monitoring will be conducted by a variety of methods with specific objectives to:

1. systematically detect and quantify vegetative communities,
2. systematically detect and quantify nongame wildlife occurrence by season and habitat type,
3. provide baseline data for evaluating management activities,
4. identify needs and priorities for nongame species in Texas.

Standardized inventory techniques have been implemented on WMAs so that efforts can be duplicated in other areas (Wagner 1993). The primary goal is to determine species composition and relative abundance by season and habitat type and to detect gross responses to management activities. The level at which these techniques were implemented was designed around manpower and experience limitations. They are primarily intended to provide a quick, effective, and man-power efficient means of determining species composition, relative abundance, and gross changes in density or distribution, in various habitat types and/or management units. Monitoring activities were not designed to test hypotheses or to detect a "threshhold level" in species response, but rather to provide background data in the event that more intensive monitoring is necessary. Intensive research projects and/or more sophisticated techniques will be needed for determining population densities, precisely measuring the effects of management practices on non-game species, and for determining if modification of existing management practices are necessary.

Small Mammals

Sherman live traps are used to assess species composition and relative abundance by season and habitat type. Trap lines have been set up in the major habitat types on each WMA. Traplines are run for a 3-night period during each of December, January, and February. A trapline consists of a minimum of 25 traps, 18 m apart. Results can be expressed as animals/trap day by species and habitat type. Incidental observations are recorded to provide supplemental data on species occurrence. To date, 22 mammal species have been recorded.

Birds

Point counts provide data on species composition and relative abundance (Ralph et al. 1992). Point counts have been set up in major habitat types. A minimum of 25 stops (counting stations) should be used. All stops should be for 5 minutes in duration. All birds seen and heard inside a 15-m radius of the counting station are recorded. Sampling can be performed once per month or seasonally to detect resident and migrating species. Mist netting can be used to determine the presence of secretive species. Intense bird watching, whether by staff or volunteers, will provide supplemental data on species composition and relative abundance. To date, 301 species have been recorded.

Reptiles and Amphibians

Drift fence arrays (Campbell and Christman 1982) are used to sample toads, frogs, lizards, snakes, turtles, and some small mammals. Drift fence arrays are being set up in each major habitat type to monitor species composition and relative abundance. Arrays should be run for a 3-night period during each of March, April, and May. Arrays require low maintenance and little manpower to check after initial installation. Road cruising during dark hours can be used to gather supplemental data for determining species composition. Opportunistic collecting (ground search by several individuals) will also provide supplemental data on species composition and relative abundance. To date, 43 species have been recorded.

Fish

Baseline data on fish species composition and distribution is being assessed with bag seines and trammel nets. Bag seines are used to sample small fish, shrimp, and crabs. Bag seines are pulled 15 m parallel to the shoreline of a waterbody. Density estimates can be calculated for each species captured. Trammel nets, 30 m in length, are used to sample larger fish. Trammel nets are set perpendicular from the shore toward the center of the waterbody. Nets are set during daylight hours to minimize conflicts with alligators. Set time (e.g., number of hours set) can vary due to weather, number of captures, etc.; therefore, results are expressed as catch rate per hour. To date, 53 species have been recorded.

Vegetation

Permanent transects have been set in each major habitat type or management unit. To date, 579 species have been documented. A modification of the point intercept method is used to monitor vegetation along the transect. A random point is picked within each 91 m segment of the transect. Vegetation is recorded at 10 points (1 pace intervals) perpendicular to the transect line at the random point. Vegetation that hits a small diameter rod at each pace interval is recorded. Results are expressed as species composition and percent cover. Preliminary analysis has indicated that the line intercept method will allow for determining a 15% change in vegetative community structure. Line intercept sampling is less labor intensive and subject to less sampling error than quadrat sampling. A Robel pole (Robel et al. 1970) is used to assess vegetation height and density along the transects. Photographs provide a visual record of vegetation conditions at key locations of each transect. Quadrat and line intercept sampling will be used to assess species composition and abundance of submergent vegetation. Enclosures (8 strand barbed wire), 0.4 ha in size, have been set up in each major habitat type to assess the effects of no management.

Research

An active research program will be implemented to:

1. evaluate and potentially improve existing wildlife and habitat management activities,
2. evaluate the effects of innovative management techniques,
3. provide information with which to evaluate harvest regulations on certain game species,
4. overall, improve our knowledge of the wealth of ecosystem components.

Studies are conducted by field staff and universities. Staff are currently involved in a long-term marsh ecology study which will examine the response of fish, birds, invertebrates, and alligators to changes in a salinity gradient in a coastal marsh. A study to assess abundance and distribution of breeding ducks on the Texas Coast and to evaluate survey methodology is being completed. A study to assess subspecific composition, age ratios, and abundance and distribution of the Gulf Coast subpopulation of sandhill cranes is also being conducted.

Summary

The CCWEP will address critical habitat and wildlife needs along the central Gulf Coast of Texas through the implementation of management and research activities designed to improve our knowledge of ecosystem components and functions in coastal wetlands and adjacent habitats. Emphasis is given to waterfowl, neotropical migrants, and endangered species, but research and management activities concurrently address the multitude of floral and faunal ecosystem components. Management is focused on improving degraded habitats and enhancing and maintaining habitat productivity and diversity for a variety of resident, migratory, and endangered species. Research will be implemented to improve biological knowledge of coastal ecosystems, evaluate and improve existing management strategies, and develop essential management actions for wetlands and adjacent habitats.

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