Edward O. Wilson

Storm Over the Amazon

The Amazonian forest of Brazil whipsaws the imagination. After two or three days there I grow familiar with the earthy smell and vegetation as though in a Massachusetts woodlot, so that what was recently new and wonderful starts to fade from my senses. Then some small event occurs to shift my conceptual framework, and the mystery comes back in its original force. One night I walked into the forest north of Manaus with a headlamp to study the ground surface and everywhere I saw—diamonds! At regular intervals of several yards, intense pinpoints of white light flashed on and off with each turning of the lamp. They were reflections from the eyes of wolf spiders on the prowl. When the spiders were spotlighted they froze into stillness, allowing me to peer at them from inches away. I could distinguish a wide variety of species by size, color, and hairiness. Where did they all come from? What was their prey, and how could so many kinds exist there in these numbers? By morning they would retreat into the leaf litter and soil, yielding the microterrain to a new set of predators. Because I had come for other purposes, I abandoned their study to the arachnologists who would surely follow.

Each evening after dinner I carried a folding chair to a clearing to escape the noise and stink of the camp I shared with Brazilian field hands. The forest around us was in the process of being clearcut northward along an east-west line, mostly to create short-lived pastures. Even so, what remained was and is one of the few great wildernesses of the world, stretching almost unbroken from where I sat across five hundred miles to the Venezuelan savannas.

Just knowing I was on the edge of that immensity deepened the sense of my own purpose. I stared straight into the dark for hours at a time, thinking in spurts about the ecological research that had attracted me there, dreaming pleasantly about the forest as a reservoir of the unknown, so complicated that its measure will not be taken in my lifetime. I was a would-be conquistador of sorts, searching not for Amazonian gold but for great discoveries to be made in the interior. I

fantasized about new phenomena and unborn insights. I confess this without embarrassment, because science is built on fantasies that can be proved true. For me the rain forest is the greatest of fantasy lands, a place of hope still unchained by exact knowledge.

And I strained to catch any trace of sound or light. The rain forest at night is an experience in sensory deprivation, black and silent as a tomb. Life is moving out there all right, but the organisms communicate chiefly by faint chemical trails laid over the surface, puffs of odor released into the air, and body scents detected downwind. Most animals are geniuses in this chemical channel where we are idiots. On the other hand, we are masters of the audiovisual channel, matched in that category only by a few odd groups like birds and lizards. At the risk of oversimplification, I can say that this is why we wait for the dawn while they wait for the fall of darkness.

So I welcomed every meteorite's streak and distant mating flash from luminescent beetles. Even the passage of a jetliner five miles up was exciting, having been transformed from the familiar urban irritant to a rare sign of the continuance of my own species.

Then one August night in the dry season, with the moon down and starlight etching the tops of the trees, everything changed with wrenching suddenness. A great storm came up from the west and moved quickly toward where I sat. It began as a flickering of light on the horizon and a faint roll of thunder. In the course of an hour the lightning grew like a menacing organism into flashes that spread across the sky and illuminated the thunderhead section by section. The sound expanded into focused claps to my left, front, and right. Now the rain came walking through the forest with a hiss made oddly soothing by its evenness of pitch. At this moment the clouds rose straight up and even seemed to tilt a little toward me, like a gigantic cliff about to topple over. The brilliance of the flashes was intimidating. Here, I knew, was the greatest havoc that inanimate nature can inflict in a short span of time: 10,000 volts dropping down an ionizing path at 500 miles an hour and a countersurge in excess of 30,000 amperes back up the path at ten times that speed, then additional back-and-forth surges faster than the eye can follow, all perceived as a single flash and crack of sound.

In the midst of the clamor something distracted my attention off to the side. The lightning bolts were acting like photoflashes to illuminate the wall of the rain forest. In glimpses I studied its superb triple-tiered structure: top canopy a hundred feet off the ground, middle tree layer below that, and a scattering of lowest trees and shrubs. At least 800

kinds of trees had been found along a short transect eastward from the camp, more than occur natively in all of North America. A hundred thousand or more species of insects and other small animals were thought to live in the same area, many of which lack scientific names and are otherwise wholly unstudied. The symmetry was complete: the Amazonian rain forest is the most that life has been able to accomplish within the constraints of this stormy planet.

Large splashing drops turned into sheets of water driven by gusts of wind. I retreated into the camp and waited with my *mateiros* friends under the dripping canvas roof. In a short time leptodactylid frogs began to honk their territorial calls in the forest nearby. To me they seemed to be saying rejoice! rejoice! The powers of nature are within our compass.

For that is the way it is in the nonhuman world. The greatest powers of the physical environment slam into the resilient forces of life and nothing much happens. The next morning the forest is still there, and although a few old trees have fallen to create clearings and the way to new plant growth, the profile stays the same. For a very long time, approximately 150 million years, the species of the rain forest evolved to absorb precisely this form and magnitude of violence. They even coded its frequent occurrence into their genes. Organisms use heavy rain and floods to time their mating and other episodes of the life cycle.

Awe is what I am talking about here. It is the most peculiar human response, an overwhelming feeling of reverence or fear produced by that which is sublime or extremely powerful, sometimes changing perception in a basic way. I had experienced it by seeing a living system in a dramatic and newly symbolic fashion. Far larger storms occur on Venus and Jupiter, but they disclose no life underneath. Nothing like the forest wall exists anywhere else we will ever visit. To drop onto another planet would be a journey into death.

A few days later the grinding of gears announced the approach of the truck sent to return me and two workers to Manaus. We watched it coming across the pastureland, a terrain strewn with fire-blackened stumps and logs, the battlefield the rain forest finally lost. On the ride back I tried not to look at it. No awe there, only defeat and decay. I think that the ultimate irony of organic evolution is that in the instant of achieving self-understanding through the mind of man, it doomed its most beautiful creations.

~~relationship to wildlife. The late Paul Shepard, by training a wildlife biologist and in spirit a philosopher, has argued that animals are what made us human. They were the other that is both different and the same. Our interaction with them, he argued, formed the basis for cognition: they were our first categories, the beginning of abstraction. The residue remains in the metaphors we retain—foxes are cunning, coyote is a trickster, wolves are at our doors—scattered across the night sky as constellations—ursa major and minor, cancer the crab, leo—in the basic positions of yoga—the lion, the cat, the camel. PAUL SHEPARD, THE OTHERS. HOW ANIMALS MADE US HUMAN (1996).~~

a. EXPLOITATION

Donald Worster, *The Nature We Have Lost, in* THE WEALTH OF NATURE

3, 3–5 (1993).

> Nostalgia runs all through this society—fortunately, for it may be our only hope of salvation. My own version, which I probably share with a few million others, takes me back to walk in pristine natural places on this continent. I dream of traveling with our second native-born naturalist, William Bartram (his father John was the first), a slightly daft Pennsylvania Quaker who botanized from the Carolinas down into Florida in the early 1770s. I would travel with him, "seduced by . . . sublime enchanting scenes of primitive nature," through aromatic groves of magnolia, sweet gum, cabbage palmetto, loblolly pine, live oak, the roaring of alligators in our ears. I would gaze with Thomas Jefferson through his elegant white-framed windows at Monticello toward the Blue Ridge Mountains, speculating about the prodigious country stretching west. Best of all, I imagine entering that west with Lewis and Clark in 1804–5, standing beside them on Spirit Mound in present-day South Dakota, beholding, as Clark put it in his execrable spelling, "a most butifull landscape; Numerous herds of buffalow were Seen feeding in various directions; the Plain to North N.W. & N.E. extends without interruption as far as Cane be seen." And I think what it must been like for them warping and poling up the muddy Missouri River, penetrating farther into the vast open country of the unplowed, unfenced prairies when wolves still howled in the night; of heading into "the great unknown," panting over the unpainted, unmined, unskied Rocky Mountains and rafting down the uncharted, undammed Columbia to the gray-green drizzly shore of the Pacific Ocean.
>
> How much has been lost in our short years as a nation, how much have we to be nostalgic about. In the beginning of white discovery North America must have been a glorious place, brimming with exquisite wild beauty, offering to agriculturists some of the earth's richest soils, incredible stands of trees, booty on booty of mineral wealth. Think for a moment of the infinitude of animals that once teemed but as now diminished or gone.

In the most comprehensive, detailed analysis yet offered, Frank Gilbert Roe estimated that forty million bison roamed the continent as late as 1830. One of the first Europeans to see them, the Spanish explorer Francisco Vasquez de Coronado, wrote almost three hundred years before that date: "I found so many cattle . . . that it would be impossible to estimate their number. For in traveling over the plains, there was not a single day, until my return, that I lost sight of them." So impressed by this animal were later American that they put its picture on one of their most common coins; now there are far more of those nickel images saved by coin collectors than bison that survive.

Ernest Thompson Seton estimated forty million white-tailed deer before there were farms and guns. Someone else has said there may have been five billion prairie dogs, as many as the present total human population of the world. And as many as three to five billion passenger pigeons, migrating in dark, torn clouds, that blotted out the sun, breaking trees when they came down to roost; now they too have vanished into carbon and gas.

Navigators encountered off Newfoundland schools of fish so dense they blocked their passage, holding them prisoners, and waterfowl so thick they could feast forever on wild duck eggs. In 1985, however, as one index of change, the U.S. Fish and Wildlife Service counted only 62 Million among all the major duck species, down more than half from a few decades earlier. If that seems like plenty of ducks, remember that we have about as many tennis rackets in our closets and far more beer can in our refrigerators. In this year there are over a thousand species on the endangered species list, and many more are threatened.

. . . .

Besides losing so many of the larger animals, we have lost entire ecological communities, complete landscapes, and with them have lost a considerable range of human feelings—the delight and joy, the humility that may come from standing in the presence of what we have called wilderness. In most parts of the country such feelings are gone forever.

NOTES

(1) Exploitation (# 1): The parable of the pigeon, pt. 1: The first stories from America were tales of exuberant bounty: "I think in all the world the like abundance is not to be found," stated Arthur Barlowe, Sir Walter Raleigh's agent, after Raleigh's trip to Virginia in 1584. Quoted in ANTHONY NETBOY, THE ATLANTIC SALMON 315 (1968). Thomas Morton described a Massachusetts with "Fowles in abundance, Fish in multitude, and . . . Millions of Turtledoves one the greene boughes: which sate pecking, of the full ripe pleasant grapes, that were supported by the lusty trees." THOMAS MORTON, NEW ENGLISH CANAAN 60 (Amsterdam 1637). *See generally* WILLIAM CRONON, CHANGES IN THE LAND 20–25 (1983). Morton's "Turtledoves" actually were passenger pigeons, a species that was literally innumerable.

In the autumn of 1813, the ornithologist and artist John James Audubon left his home in Henderson, Kentucky to ride to Louisville. A few miles beyond Hardensburgh, he observed a flight of passenger pigeons flying overhead.

> [F]eeling an inclination to count the flocks that might pass within the reach of my eye within one hour, I dismounted, seated myself on an eminence, and began to mark with my pencil, making a dot for every flock that passed. In a short time, finding the task which I had undertaken impracticable, as the birds poured in countless multitudes, I rose, and counting the dots then put down, found that one hundred and sixty-three had been made in twenty-one minutes.... The air was literally filled with pigeons; the light of noonday was obscured as by an eclipse.

JOHN JAMES AUDUBON, ORNITHOLOGICAL BIOGRAPHY *reprinted in* W.B. MERSHON, THE PASSENGER PIGEON 25, 28 (1907). Pigeons continued to pass "in undiminished numbers" for the rest of the fifty-five miles to Louisville "and continued to do so for three days in succession." Audubon estimated that at times more than 300,000,000 pigeons flew by each hour; he also estimated that the flock covered an area of 180 square miles and contained 1,150,136,000 individuals. The ornithologist Alexander Wilson reported an earlier flight that he estimated contained more than 2 billion birds. ALEXANDER WILSON, WILSON'S AMERICAN ORNITHOLOGY 399 (T.M. Brewer ed., Boston, Otis, Broaders & Co. 1840).

The passenger pigeon was endemic to the deciduous forest ecosystem of eastern North America. The species was highly gregarious and nested in colonies containing millions of breeding pairs. One nesting colony in Wisconsin in 1871 covered 850 square miles and contained at least 135,000,000 adults. The sheer number of birds in a flock was a critical adaptive strategy: "By traveling and nesting in such large groups each pigeon was essentially shielded from predators, a concept known as predator satiation. Wherever the pigeons went there were not enough local predators to seriously detract from their numbers." David E. Blockstein & Harrison B. Tordoff, *A Contemporary Look at the Extinction of the Passenger Pigeon,* 39 AM. BIRDS 845, 846 (1985). This strategy extended to reproduction; nesting was highly synchronous with most eggs laid on a single day. The beech, oak, and chestnut trees that provided the pigeon's dominant food employed a similar strategy: every few years the trees in a particular area would produce a super-abundant crop of nuts that overwhelmed their local seed predators. The pigeons roamed the countryside until they found an area with a heavy mast crop, where they would remain until that crop was exhausted.

The pigeon was probably the most abundant bird on the planet when Audubon recorded his sighting. It existed in such prodigious numbers that it seemed an inexhaustible resource. In 1857, a select committee of the Ohio Senate urged rejection of legislation to restrict hunting since "[t]he passenger pigeon needs no protection. Wonderfully prolific, ... no ordinary destruction can lessen them or be missed from the myriads that are yearly produced." T.S. PALMER, UNITED STATES DEPARTMENT OF AGRICULTURE, BIOLOGI-

cal Survey Bulletin No. 41, Chronology and Index of the More Important Events in American Game Protection, 1776–1911 18 (1912).

(2) Subsistence and markets: The parable of the pigeon, pt. 2: Pigeons were tasty; they were also used as live predecessors of today's clay "pigeons." Their gregarious habits made them easy to capture or kill: reports of killing a dozen or more with one shot-gun blast are common and they were netted by the thousands. As long as hunting was restricted to subsistence needs, the pigeon population withstood the pressure.

It could not, however, withstand market demand. Although commercial marketing of pigeons became a major industry after 1840, the post-Civil–War period brought a fundamental shift in scale as the nation rushed to privatize public resources—a scramble that Vernon Parrington labeled the "great American barbecue." Vernon L. Parrington, Beginnings of Critical Realism in America: 1860–1920, at 23 (1958).

After the Civil War, the nineteenth century's most advanced technology was available in the service of the pigeon netters. The new technologies changed the scale of the harvesting of pigeons: the railroad (with its rapid transportation), the refrigerator car (which prevented spoilage), and the telegraph opened markets in eastern cities and allowed netters to determine the locations of nestings. The railroads and express companies realized substantial revenue from shipping pigeons. They also had a network of agents with access to telegraph. This network allowed the birds to be tracked on the northward migration. A.W. Schorger, The Passenger Pigeon 146 (1955). The tonnage of birds shipped to market is as staggering as the reports of their migratory flights: from an 1869 nesting in Michigan more than 7,500,000 pigeons were shipped; in 1874, 40–50 tons of squabs—unfledged nestlings—were shipped from Newaygo County, Michigan and another 1,075,000 pigeons were shipped to market from nearby Shelby. The last large nesting was in Petoskey, Michigan in 1878; the colony covered approximately 100 square miles.

The penetration of the market into all regions has impacted even those peoples who still rely to a significant extent upon hunting and gathering. Markets change the nature of subsistence hunting and gathering by converting it into an alternative source for some commodities. The relationship between market and subsistence varies, of course. In some areas, hunting and gathering supplements a primarily market-based life; in others, market commodities add to an essentially subsistence life. Regardless of the point along this continuum, "the most dramatic kind of environmental change occurs when resource procurement ceases to be aimed at subsistence and is instead market-driven.... That is, demand for resources is not based on local nutritional or technological needs, but rather on the opportunities presented by an external market." Raymond Hames, *Wildlife Conservation in Tribal Societies, in* Biodiversity: Culture, Conservation, and Ecodevelopment 172, 178–79 (Margery L. Oldfield & Janis B. Alcorn eds., 1991). *See also* Richard White, Roots of Dependence: Subsistence, Environment, and Social Change among the Choctaws, Pawnees, and Navajos (1983).

Much of the change is traceable to the fact that it becomes necessary to produce commodities for trade for the goods purchased. For example, rather than killing enough game for the community larder, hunters need to

produce a surplus to trade for market goods. The market and market-based agriculture permit greater population levels than would otherwise be sustainable in an ecosystem and this in turn can increase pressure on local wildlife populations both as a result of habitat destruction and from increased hunting pressures.

(3) Exploitation (# 2): A defense of the pigeon netters was provided in 1878 by a wholesaler. It has a modern ring:

> In conclusion, the pigeons are as much an article of commerce as wheat, corn, hogs, beeves, or sheep. It is no more cruel to kill them for market by the thousand, than it is to countenance the killing at the stock yards in this or any other large commercial centre.... A farmer can market his poultry dead or alive at any time of the year, and the slaughter, the country over, is larger than that of pigeons, yet no one in interest of "justice and humanity" interferes. The pigeon is migratory, it can care for itself. It nests in the impenetrable wilds of Arkansas, the Indian territory, Canada and British America, as often as in the land of civilization where it can be reached for market. It is a source of profit to the poor, or pleasure to the rich. Its benefits to the Emmett county homesteaders as felt through the cold of this Winter alone, are enough to compensate for [any] evils ..., and Emmett county is but a sample of whatever location the birds may settle in. Let the law, in regard to distance, stand as it is; enforce it against all alike. Make no exceptions. Let the rule of supply and demand govern the catching, and you will have something better than all the professors in Michigan can suggest. Let the supply be so large that prices are low and wages can't be made and law or no law the catching will stop. But don't make a law that will take bread out of the homesteader's mouth, and work from hundreds of poor and honest men; no, not even if the birds should be sacrificed, to a certain extent, for man is above the beasts, and the "beasts of the field and the birds of the air" are given unto him for his benefit and his profit.

Mr. E.T. Martin's Reply to Prof. Roney, CHICAGO FIELD, Jan. 25, 1879.

(4) Exploitation (# 3): The rule of capture: The flocks of passenger pigeons and the herds of buffalo and the schools of fish seemed to make a mockery of restraint. As a result, a policy of free access was simply assumed. As Supreme Court Justice Stephen J. Field wrote,

> The wild bird in the air belongs to no one, but when the fowler brings it to earth and takes it into his possession it is his property.... So the trapper of the plains and the hunter of the north have a property in the furs they have gathered, though the animals from which they were taken roamed at large and belonged to no one.

Spring Valley Water–Works v. Schottler, 110 U.S. 347, 374 (1884) (Field, J., dissenting).

The purest example of unrestrained exploitation is the rule of capture, which is examined in Chapter II.

~~PERSPECTIVES~~

~~**(1) The shifting baseline:** Despite Worster's hope for the restorative powers of nostalgia, our species often suffers from forgetfulness. Daniel~~

CHAPTER XII

BIODIVERSITY: A PRIMER ON SCIENCE, VALUES, AND POLICY

~~Thus far our inquiry has focused on individual organisms and, in the last chapter, on enclaves of land managed for wildlife habitat. In this chapter and the two that follow, our focus shifts from individual animals to species and populations. The inquiry widens to include a broad range of species that the law, until recently, has deemed valueless. Even more significant is the focus on landscapes and ecological processes—on the entire interconnected web of life.~~

~~The dominant conservation challenge of our time is the disruption of biological diversity—or "biodiversity," as the concept has come to be termed. What biodiversity is, and why it is important, are the subjects of this chapter. The materials also survey the causes of the loss of native biodiversity and the scientific and policy responses to these losses. This chapter is the background for the book's final two chapters—Chapter 13, which examines the federal Endangered Species Act, and Chapter 14, which considers the legal bases for managing landscapes to promote biodiversity.~~

SECTION 1. A STATUS REPORT ON BIODIVERSITY

DAVID QUAMMEN, THE SONG OF THE DODO
11–12 (1996).

Let's start indoors. Let's start by imagining a fine Persian carpet and a hunting knife. The carpet is twelve feet by eighteen, say. That gives us 216 square feet of continuous woven material. Is the knife razor-sharp? If not, we hone it. We set about cutting the carpet into thirty-six equal pieces, each one a rectangle, two feet by three. Never mind the hardwood floor. The severing fibers release small tweaky noises, like the muted yelps of outraged Persian weavers. Never mind the weavers. When we're finished cutting, we measure the individual pieces, total them up—and find that, lo, there's still nearly 216 square feet of recognizably carpetlike stuff. But what does it amount to? Have we got thirty-six nice Persian throw rugs? No. All we're left with is three dozen ragged fragments, each one worthless and commencing to come apart.

Now take the same logic outdoors and it begins to explain why the tiger, *Panthera tigris,* has disappeared from the island of Bali. It casts light on the fact that the red fox, *Vulpes vulpes,* is missing from Bryce Canyon National Park. It suggests why the jaguar, the puma, and forty-five species

of birds have been extirpated from a place called Barro Colorado Island—and why myriad other creatures are mysteriously absent from myriad other sites. An ecosystem is a tapestry of species and relationships. Chop away a section, isolate that section, and there arises the problem of unraveling.

. . . . Thomas E. Lovejoy, a tropical ecologist at the Smithsonian Institution, has . . . coin[ed] his own term. Lovejoy's term is *ecosystem decay*.

His metaphor is more scientific in tone than mine of the sliced-apart Persian carpet. What he means is that an ecosystem—under certain specifiable conditions—loses diversity the way a mass of uranium sheds neutrons. Plink, plink, plink, extinctions occur, steadily but without any evident cause. Species disappear. Whole categories of plants and animals vanish.

a. WHAT IS BIODIVERSITY?

REED F. NOSS & ALLEN Y. COOPERRIDER, SAVING NATURE'S LEGACY 3–12 (1994).

In little more than a decade, biodiversity progressed from a short-hand expression for species diversity into a powerful symbol for the full richness of life on earth. Biodiversity is now a major driving force behind efforts to reform land management and development practices worldwide and to establish a more harmonious relationship between people and nature.

Biodiversity. A symbol? An issue? A driving force? It would be easier if biodiversity could be measured by the quantity of bird species in a forest, wildflowers in a meadow, or beetles in a log. But simplicity is not one of the virtues of biodiversity. Ecosystems are more complex than we can imagine. Our most intricate machines—say, a space shuttle and all its ground-control computers—are simple toys compared to an old-growth forest, its myriad known and unknown species, and their intricate genetic codes and ecological interactions. Just identifying and counting species is difficult enough. The almost infinite complexity of nature defies our best efforts to classify, categorize, or even describe.

A common misconception is that biodiversity is equivalent to species diversity—the more species in an area, the greater its biodiversity. However, biodiversity is not just a numbers game. On a global scale, maintaining maximal species richness is a legitimate goal and requires keeping global extinction rates low enough that they are balanced or surpassed by speciation. When we consider species richness at any scale smaller than the biosphere, quality is more important than quantity. It is not so much the number of species that we are interested in, it is their identity. Fragmenting an old-growth forest with clearcuts, for example, would increase species richness at a local scale but would not contribute to species richness at a broader scale if sensitive species were lost from the landscape.

Diversification can all too easily become homogenization. The greatest cause of homogenization worldwide is the introduction of nonnative plants and animals, often called exotics. Exotics are species that have invaded new areas due to accidental or deliberate transport by humans. Although

species naturally disperse and colonize new areas, so that floras and faunas change continually over long periods of time, human transport and habitat disturbance have greatly increased the rate and scale of invasions. Many regions have nearly as many exotic as native species today. Introductions of exotics may increase species richness locally or even regionally, but they contribute nothing positive to biodiversity. Rather, they pollute the integrity of regional floras and faunas and often alter fundamental ecological processes, such as fire frequency and intensity, and nutrient cycles. Thus, whole ecosystems are changed. Regions invaded by exotics lose their distinctive characters. Every place begins to look the same. The result is global impoverishment. For these reasons, we emphasize *native biodiversity*, not diversity per se.

The important task is not to define biodiversity, but rather to determine the components of biodiversity in a region, their distribution and interrelationships, what threatens them, how we measure and monitor them, and what can be done to conserve them. . . .

> Biodiversity is the variety of life and its processes. It includes the variety of living organisms, the genetic differences among them, the communities and ecosystems in which they occur, and the ecological and evolutionary processes that keep them functioning, yet ever changing and adapting.

This definition recognizes variety at several levels of biological organization. Four levels of organization commonly considered are genetic, population/species, community/ecosystem, and landscape or regional. Each of these levels can be further divided into compositional, structural, and functional components of a nested hierarchy. Composition includes the genetic constitution of populations, the identity and relative abundance of species in a natural community, and the kinds of habitats and communities distributed across the landscape. Structure includes the sequence of pools and riffles in a stream, down logs and snags in a forest, the dispersion and vertical layering of plants, and the horizontal patchiness of vegetation at many spatial scales. Function includes the climatic, geological, hydrological, ecological, and evolutionary processes that generate and maintain biodiversity in ever-changing patterns over time.

. . . .

Conserving biodiversity, then, involves much more than saving species from extinction. As implied by our characterization of biodiversity, biotic impoverishment can take many forms and occur at several levels of biological organization. . . .

GENETIC LEVEL

Genes, sequences of the DNA (deoxyribonucleic acid) molecule, are the functional units of heredity. Species differ from one another and individuals within species vary largely because they are unique combinations of genes. Gene frequencies and genotypes (individual organisms with a particular genetic make-up) within a population change over time as a consequence of both random and deterministic forces. Random changes include mutations that create new genes or sequences of genes, and loss of genes by

change in small populations (called sampling error or genetic drift). Deterministic changes include natural and artificial selection, where some genotypes are more successful reproducers than others. In the long run, genetic change leads to evolutionary change as individuals adapt to different situations and pass on their new traits to offspring. Genetic diversity is fundamental to the variety of life and is the raw material for evolution of new species....

Conservation goals at the genetic level include maintaining genetic variation within and among populations of species, and assuring that processes such as genetic differentiation and gene flow continue at normal rates....

. . . .

SPECIES LEVEL

The species level of diversity is probably what most people think of when they hear the term *biodiversity*. Although in some ways species diversity is the best known aspect of biodiversity, we should bear in mind that the vast majority of species in the world are still unknown. Of an estimated 10 to 100 million species on Earth, we have named only about 1.8 million. Known species are dominated by insects, half of them beetles. But many invertebrates, bacteria, and other organisms remain to be discovered, even in the United States. Hundreds of invertebrate species can be found in one square meter of soil and litter in old-growth temperate forest. Even more amazing, Norwegian microbiologists found between 4000 and 5000 species of bacteria in a single gram of soil from a beech forest....

A population is a local occurrence of a species and is the unit that we usually manage. Conservation goals at the population/species level include maintaining viable populations of all native species in natural patterns of abundance and distribution. These goals grade into community-level goals of maintaining native species richness and composition.

Despite the problems and biases of single-species management, many species require individual attention, particularly when they have become so rare that heroic measures are needed to save them. In addition, certain kinds of species warrant management emphasis because their protection will conserve more than themselves. Especially important in this regard are keystone species, which play pivotal roles in their ecosystems and upon which a large part of the community depends. The importance of a keystone species is often disproportionate to its abundance. The beaver, for instance, creates habitats used by many species and also regulates hydrology and other ecosystem functions. If we reduce beaver numbers through heavy trapping, then all else being equal, we impoverish the landscape. The beaver is not an endangered species, but it is greatly reduced or even absent from many regions where it was once abundant....

Some kinds of species have great pragmatic value for conservation, especially those we can characterize as "umbrellas" or "flagships." To illustrate the umbrella concept, consider a carnivore (such as a grizzly bear or wolf) that requires millions of acres of land to maintain a viable population. If we secure enough wild habitat for these large predators,

many other less-demanding species will be carried under the umbrella of protection. Umbrella species are often charismatic, so they also function as flagships or symbols for major conservation efforts. The grizzly bear, for instance, is a potent symbol for wilderness preservation in the northern Rocky Mountains. No umbrella is complete, however. Some endemic plant species have very small ranges—perhaps restricted to a single rock outcrop—that might not be protected in an ideal wilderness network established for grizzlies.

. . . .

COMMUNITY OR ECOSYSTEM LEVEL

In many cases, conservation is most efficient when focused directly on the community or ecosystem. A community is an interacting assemblage of species in an area. Terrestrial communities are usually defined by their dominant plants (for instance, the beech-maple forest), but functional or taxonomic groups of animals (for example, bird communities, lizard communities, herbivore communities) are also recognized. Functional groups of organisms (species that use a set of resources in similar ways, such as bark-gleaning birds) are often called *guilds*. Similarly, aquatic communities may be taxonomically or functionally defined, for example fish communities or littoral (shoreline) vegetation.

An ecosystem is a biotic community plus its abiotic environment. Ecosystems range in scale from microcosms, such as a vernal pool, to the entire biosphere. Many ecologists equate the terms *ecosystem* and *community*, except that ecosystem ecologists emphasize processes more than species and other entities. . . .

LANDSCAPE AND REGIONAL LEVELS

If biodiversity occurs at multiple levels of organization, it is worth protecting at all levels. Forman and Godron defined a landscape as "a heterogeneous land area composed of a cluster of interacting ecosystems that is repeated in similar form throughout." . . .

A primary conservation goal at the landscape or regional level is to maintain complete, unfragmented environmental gradients. This extends the representation goal beyond traditional ecosystem boundaries. Species richness and composition are known to vary along environmental gradients. The most commonly studied gradient is elevation. In the western Cascades of Oregon, the number of species and amphibians, reptiles, and mammals declines sharply with increasing elevation. This presents a problem for conservation, because generally speaking, the low-elevation, high-diversity sites are private lands which are often heavily exploited and have few natural areas left. Mid-elevation sites are commodity-production public lands, and large protected areas (such as designated wilderness) occupy the high-elevation, lowest diversity sites. This biased pattern of habitat protection is common throughout the western Untied States.

NOTES

(1) Keystones and umbrellas: Although Noss and Cooperrider neither propose to reduce the task nor offer any shortcuts that might allow us to

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
CORPUS CHRISTI DIVISION

THE ARANSAS PROJECT, *Plaintiff*, v. BRYAN SHAW in his official capacity as CHAIRMAN OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY, and BUDDY GARCIA and CARLOS RUBINSTEIN, each in their official capacity as COMMISSIONERS OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY, and MARK VICKERY in his official capacity as EXECUTIVE DIRECTOR OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY, and AL SEGOVIA in his official capacity as SOUTH TEXAS WATERMASTER, *Defendants.*	§ §	CIVIL ACTION NO. _____

ORIGINAL COMPLAINT
FOR DECLARATORY AND INJUNCTIVE RELIEF

I. INTRODUCTION AND SUMMARY OF THE CASE

1. This litigation seeks declaratory and injunctive relief to eliminate, or at least to reduce significantly, immense threats to the very existence of Whooping Cranes. The Texas Commission on Environmental Quality ("TCEQ") and its officials cause these threats by agency actions, and refusals and failures to act, in managing freshwater uses and flows on the Guadalupe and San Antonio Rivers.

2. Whooping Cranes, magnificent birds, face extinction. More than half of all known adults and their young live in the flock that winters in Aransas National Wildlife Refuge (in Texas) and summers in Wood Buffalo National Park (in Canada). Only 263 birds remain. Last winter in Texas, 23 birds died, representing a loss of 8.5% of the wintering flock.

3. These deaths directly reflect the lack of sufficient freshwater flowing to San Antonio-Aransas Bay system. The Cranes need freshwater to drink, and to support two essential food sources – the wolfberry and, perhaps most importantly, for protein, the blue crab. Some Cranes literally face winter starvation, including the young whose own parents will push them away from feeding areas in a desperate effort to save their own lives.

4. This litigation alleges that Defendants – the three TCEQ Commissioners, the TCEQ Executive Director and the South Texas Watermaster of the TCEQ – in their roles to regulate water uses and flows, harmed and harassed the Whooping Cranes last winter in Aransas County, Texas, thereby violating Section 9 of the federal Endangered Species Act ("ESA") by causing a "take" of this already endangered species.

5. This litigation further alleges that, unless Defendants alter these practices, such harm and harassment in all likelihood will again occur, possibly leading to even more severe harm than occurred during the winter of 2008-2009, which is the worst on record. Indeed, with increasing water use in the Guadalupe basin, the Cranes face an existential threat – lack of freshwater could mean, literally, that they face extinction. Federal law forbids any such "take", actual or threatened, even if Defendants did not intend or even did not want their actions to cause harm. As far as Plaintiff is aware, none of the Defendants have taken any action to reduce this existential threat to Whooping Cranes well known to be caused by lack of freshwater.

6. Members of plaintiff – The Aransas Project – include numerous groups and businesses representing diverse interests and activities. They have a direct interest in the Whooping Crane and the ecological health of San Antonio, Carlos, Mesquite and Aransas Bays in their own right, as well as through their members.

7. Among these groups are the International Crane Foundation, Aransas County, the City of Rockport, the Town of Fulton, the Aransas County Navigation District, the Coastal Bend Guides Association, Rockport Birding and Kayak Adventures, Casterline Fishing Company, the Aransas Bird and Nature Club, the Aransas County Republican Party, the Aransas County Democratic Club, the American Bird Conservancy, the Coastal Bend Audubon Society, the Houston Audubon Society, the Travis Audubon Society, The Whooping Crane Conservation Alliance, the Texas Conservation Alliance, the Matagorda Bay Foundation, the Galveston Bay Conservation and Preservation Association, Environment Texas, Anthony's By the Sea, the Crane House, Durham and Associates, Hamilton A/C, Electric and Plumbing, Key Allegro Properties LLC, Pelican Rentals, MasterPlan Design, and James Fox Guide Service. These groups and over 200 individual members can be found at the web site of the Aransas Project at http://www.thearansasproject.org.

8. In this litigation, The Aransas Project is seeking injunctive relief to compel TCEQ officials to take appropriate steps to protect the wintering Whooping Crane from the negative impacts of water withdrawals from the Guadalupe and San Antonio River systems. Such steps could include, for example, creation of a Habitat Conservation Plan for the Whooping Crane pursuant to Section 10 of the ESA, compilation of a comprehensive and thorough inventory of all water withdrawals from the Guadalupe and San Antonio River systems, and identification of a process to reduce freshwater withdrawals during times of drought and low flow in order to

maintain flows into the San Antonio-Aransas Bay system, sufficient to prevent harm and harassment to the Whooping Cranes. It may also be appropriate to establish a special master to oversee this process.

II. JURISDICTION AND VENUE

9. This Court has jurisdiction and the authority to grant the relief requested pursuant to 16 U.S.C. §§ 1540(c) & (g) (ESA), 28 U.S.C. § 1331 (federal question), and 28 U.S.C. § 2201 *et seq*. (Declaratory Judgment Act).

10. Plaintiff has satisfied the jurisdictional requirements for bringing this suit. Under 16 U.S.C. § 1540(g)(2)(A)(i), Plaintiff notified all Defendants of their violations of the ESA and of Plaintiff's intent to sue for those violations by certified letter sent on December 7, 2009 ("Notice Letter"), attached as Exhibit 1. Defendants Shaw, Garcia, Rubinstein, Vickery, and Segovia and/or their authorized agents received the Notice Letter on December 9, 2009.

11. Plaintiff also gave notice of its intent to sue by sending the Notice Letter, on December 7, 2009, to Ken Salazar, Secretary of the Interior, and Sam Hamilton, Director of the United States Fish and Wildlife Service ("FWS"), which was received on December 14, 2009.

12. More than sixty days have passed since the Notice Letter was served and the violations complained of in the Notice Letter are continuing and reasonably likely to continue to occur. The named Defendants have not taken any actions to remedy or prevent continued violations of the Act. The Secretary of the Interior has not commenced an action to impose a penalty pursuant to 16 U.S.C. § 1540(a) and the United States has not taken any action to prevent continued violations of the Act.

13. Venue is appropriate in the Corpus Christi Division of the Southern District of Texas under the ESA, 16 U.S.C. § 1540(g)(3)(A), because alleged violations have occurred and will occur in this district. Venue is also appropriate in this district under 28 U.S.C. § 1391(b).

III. PARTIES

14. Plaintiff, The Aransas Project ("TAP") is suing on behalf of itself and its members to protect one of the Nation's most unique and important ecological assets – the Whooping Crane. TAP is dedicated to the research, development and publication of proposals to protect the health of the streams and estuaries in and around the San Antonio-Aransas Bay system, including monitoring and taking legal action to protect the ecology of the region. Members include organizations, businesses and individuals dedicated to the protection and preservation of the Whooping Cranes and the natural resources of the region as well as commercial entities receiving all or part of their economic livelihood from Whooping Crane-related activities. TAP, as a non-profit corporation with principal place of business in Aransas County, Texas, has members who are injured by Defendants' violations of the ESA.

15. Defendant Bryan Shaw is sued in his official capacity as TCEQ Chairman. Defendant Shaw, through his actions at the TCEQ, regulates water diversion activities through the review and approval of water permits, and the rules, regulations and policies governing them. Defendant Shaw has a duty to ensure the water diversion activities authorized are consistent with applicable laws and regulations, including the ESA, and that authorization of such activities does not cause a "take" of species protected by the ESA.

16. Defendants Buddy Garcia and Carlos Rubinstein are sued in their official capacity as TCEQ Commissioners. Defendants Garcia and Rubinstein, through their actions at the TCEQ, regulate water diversion activities through the review and approval of water permits, and the rules, regulations and policies governing them. Defendants Garcia and Rubinstein have a duty to ensure the water diversion activities authorized are consistent with applicable laws and regulations, including the ESA, and that authorization of such activities does not cause a "take" of species protected by the ESA.

17. Defendant Mark Vickery is sued in his official capacity as TCEQ Executive Director. Defendant Vickery, through his actions at the TCEQ, regulates water diversion activities through the review and approval of water permits, and the rules, regulations and policies governing them. Defendant Vickery has a duty to ensure the water diversion activities authorized are consistent with applicable laws and regulations, including the ESA, and that authorization of such activities does not cause a "take" of species protected by the ESA.

18. Defendant Al Segovia is sued in his official capacity as the South Texas Watermaster, a TCEQ employee. Defendant Segovia, through his actions as the South Texas Water Master, regulates water diversion activities through the review and approval of each intended water diversion activity. Defendant Segovia has a duty to ensure the water diversion activities authorized are consistent with applicable laws and regulations, including the ESA, and that authorization of such activities does not cause a "take" of species protected by the ESA.

IV. THE STATUTORY BACKGROUND

19. Congress enacted the Endangered Species Act, 16 U.S.C. § 1531 *et seq.*, "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved... [and] to provide a program for the conservation of such endangered species and threatened species...." 16 U.S.C. § 1531(b).

20. Before a species receives critical protection under the ESA, FWS must list the species as either "threatened" or "endangered." 16 U.S.C. § 1533. An "endangered species" is one that is "in danger of extinction throughout all or a significant portion of its range." 16 U.S.C. § 1532(6). A "threatened species" is one that is "likely to become an endangered species within the foreseeable future through all or a significant portion of its range." 16 U.S.C. § 1532(20).

21. Under the ESA, 16 U.S.C. § 1538(a)(1)(B), it is illegal to engage in any activity that "takes" an endangered species. The ESA's take prohibition applies to all listed species, including the Whooping Crane. 50 C.F.R. § 17.31; 55 Fed. Reg. 26114 (June 26, 1990).

22. Congress intended to define "take" in the "broadest possible manner to include every conceivable way" in which any person could harm or kill fish or wildlife. S. Rep. No. 307, 93rd Cong., 1st Sess. 1, reprinted in 1973 U.S. Code Cong. & Admin. News 2989, 2995.

23. The term "take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." 16 U.S.C. § 1532(18).

24. The term "harm" includes "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering." 50 C.F.R. § 17.3.

25. The term "harass" means "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering." 50 C.F.R. § 17.3.

26. The U.S. Supreme Court has upheld the definitions of "harm" and "harass". *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*, 515 U.S. 687 (1995).

27. The ESA forbids "takes" by all "persons," including any "officer, employee, agent, department, or instrumentality of … any State." 16 U.S.C. § 1532(13).

28. In the ESA, Congress recognized that sometimes otherwise lawful activities can cause a take of a listed species. 16 U.S.C. § 1539. This is known as an 'incidental take.'

29. In some circumstances, Congress authorized those persons responsible for the take to seek an Incidental Take Permit. 16 U.S.C. § 1539(a). The Incidental Take Permit is

issued by FWS after development and submission of a Habitat Conservation Plan ("HCP") which must be approved by FWS. The HCP must include conservation measures designed to minimize and mitigate the impacts of taking species listed under the Act. 16 U.S.C. § 1539(a)(2)(A)(ii). In the absence of an Incidental Take Permit, the ESA forbids each and every take.

30. The ESA expressly authorizes citizens to sue and seek an injunction against any "person" alleged to be responsible for a take, or otherwise in violation of the ESA, including any governmental instrumentality or agency. 16 U.S.C. § 1540(g)(1).

31. As the U.S. Supreme Court has held, Congress has accorded the protection of endangered species the highest of priorities, so courts do not have the discretion to withhold injunctive relief where it is necessary to prevent an imminent and likely violation of the ESA. *Tennessee Valley Auth. v. Hill*, 437 U.S. 153, 184 (1978).

32. A Court must issue an injunction if a plaintiff establishes by a preponderance of the evidence that there is "a reasonably certain threat of imminent harm to a protected species." *Defenders of Wildlife v. Bernal*, 204 F.3d 920, 925 (9th Cir. 2000).

V. BACKGROUND FACTS

33. The Whooping Crane (*Grus americana*), a graceful and stately bird that can stand nearly six feet tall, captures the attention of all. While this species is limited in range to North America, other cranes exist abroad and, with migration routes crossing borders, they have been called international ambassadors of goodwill and symbols of peace. They are also referred to as ambassadors of water because their survival worldwide is so often intertwined with water issues and wetlands. In this sense the Whooping Crane faces threats common to other crane species, because without freshwater to maintain their already diminishing wetlands habitat, they will die.

34. The flock of Whooping Cranes that is the subject of this litigation is the Aransas-Wood Buffalo flock, so-named because they winter at the Aransas National Wildlife Refuge ("ANWR" or "Refuge") in Aransas County, Texas and breed in Canada's Wood Buffalo National Park during the summer.

35. The Aransas-Wood Buffalo flock of Cranes is the only natural population that both migrates and survives on its own.

36. No more than approximately 500 Whooping Cranes exist worldwide, including those in zoos or otherwise in captivity.

37. After decades of federal protection in this country and Canada, the Aransas-Wood Buffalo flock stood at an all-time high of 270 in the spring of 2008, more than half of all birds worldwide.

38. A year later, fifty-seven birds had died, a staggering loss of 21.4% of the flock.

39. Twenty-three of these deaths occurred here in Texas (8.5% of the flock).

40. After this mortality, the following nesting season (2009) resulted in abnormally low productivity.

41. A critical reason the Cranes are dying is because not enough freshwater is flowing into the San Antonio Bay ecosystem and those habitats connected to it, including the Carlos, Mesquite and Aransas bay ecosystems and the adjacent marshes.

42. This reduction in freshwater inflow affects the Cranes in three crucial ways: it reduces the availability of blue crabs, their most important food source; it reduces the abundance of wolfberry fruit, another important food source; and it reduces the availability of drinkable water.

43. In good years, with sufficient water, most foraging occurs in the brackish bays, marshes, and salt flats on the edge of the mainland and on barrier islands. When necessary, Cranes fly to upland sites in search of freshwater to drink or to find foods such as acorns, snails, crayfish and insects, and then return to the marshes to roost.

44. When freshwater inflows fall too low, the Cranes have to fly further, forage longer, and expend more energy.

45. When critical food is scarce in their territory, Cranes often respond by abandoning their own juvenile and forcing it to try to fend for itself.

46. Malnutrition, emaciation and susceptibility to disease and predation, especially of the juveniles, all resulted in the mortality witnessed in 2008 - 2009.

47. The plight of the Cranes at Aransas has captured the attention of international, national and local groups, who have joined The Aransas Project to protect the Cranes.

48. The named Defendants are responsible for the management of the surface freshwater resource that the Cranes rely on.

49. Not enough freshwater flowed into the San Antonio bay ecosystem and the Aransas marshes during 2008-2009 because of Defendants' actions and inactions.

50. Defendants took no action to avoid harm, harassment and illegal takes of Cranes, and are unlikely to do so in the future.

51. This is actionable under the Endangered Species Act, even if there is no intent to cause the take.

A. Whooping Crane Biology and Conservation Status

52. The Whooping Crane is a flagship species for the North American wildlife conservation movement, symbolizing the struggle for survival that characterizes endangered species worldwide.

53. This Crane is a large white bird with black wing tips and a red crown and is the largest American bird, standing approximately six feet in height.

54. In their native habitat in the flat marsh adjacent to the San Antonio, Copano, Aransas, Espiritu Santo, Carlos and Mesquite Bays in Aransas County, Texas, these birds are simply magnificent. The pairs hunt crabs in the marsh ponds, and when successful in breeding are joined by a single orange-tinted juvenile that relies on its parents in its early journey through life.

55. Due to its charisma and aura, the Whooping Crane is often used as a cornerstone species in educational materials associated with endangered species.

56. In the United States, the Whooping Crane was listed as threatened with extinction in 1967, 32 Fed. Reg. 4001 (Mar. 11, 1967), and as endangered in 1970, 35 Fed. Reg. 16047 (Oct. 13, 1970). Both of these listings were "grandfathered" into the Endangered Species Act of 1973. 16 U.S.C. § 1531, *et seq*., 87 Stat. 884.

57. The Aransas National Wildlife Refuge originally comprising 47,261 acres was established on December 31, 1937 by Executive Order 7784.

58. Critical Habitat was designated in 1978 for the Crane's winter habitat at Aransas. Determination of Critical Habitat for the Whooping Crane, 43 Fed. Reg. 20938, 20942 (final notice, May 15, 1978).

59. This Designated Critical Habitat includes the Aransas National Wildlife Refuge and the Blackjack Peninsula, and extensive portions of San Antonio, Espiritu Santo Carlos, and Mesquite Bays, Matagorda Island, St. Charles Bay and Lamar Peninsula.

60. The Aransas-Wood Buffalo Population migrates during both spring and fall through a relatively narrow (80-300 km wide) corridor between Aransas and Wood Buffalo.

61. Historic population declines resulted from habitat destruction, shooting, and displacement by human activities.

B. The 2008-2009 Whooping Crane Mortality Event is Unprecedented

62. Aerial counts have provided an annual census starting in 1950 of how many Whooping Cranes arrive at Aransas in the fall and how many depart in the spring.

63. Between 1950 and 1986, a total of only 26 Whooping Cranes were lost on the wintering grounds in Texas.

64. That thirty-six year total is dwarfed by the catastrophe of 23 Cranes lost during the winter of 2008-2009 in Texas.

65. The flock size declined from a peak of 270 to 247 individuals (a loss of 23 birds) by the end of the 2008-2009 wintering season. Of the 38 juveniles, only 22 survived the 2008-2009 winter.

66. When added to the 34 birds that left Texas in spring 2008 and failed to return in the wintering season 2008-2009, 21.4% of the flock (57 birds) was lost during that year.

67. The 2009 breeding season in Canada was also bad, with a lower than average productivity rate of only 22 young fledged from 62 nests, roughly half the productivity of the previous summer season. This illustrates the difficulties Cranes experience in breeding.

68. The FWS census of February 2010 estimates the flock size at 244 adults and 19 juveniles, for a total of 263.

69. At least one juvenile already has died during the 2009-10 season in Texas.

70. In short, the past few years have been a very bad time for the Whooping Crane.

C. Cause of Crane Mortality

71. Food resources were very poor throughout the 2008-2009 winter. The fall wolfberry crop was far below average, and blue crabs were scarce from December through March.

72. The lack of food directly caused the high winter mortality.

73. When critical food is scarce in their territory, Cranes often respond by abandoning their own juvenile and leaving it to fend for itself.

74. Malnutrition, emaciation and susceptibility to disease and predation, especially of the juveniles, all result in the mortality that was witnessed.

75. Bay and marsh salinities were high throughout the season so that Cranes were forced to fly to freshwater to drink, with flight using an estimated 19 times more energy than a Crane at rest.

76. The much reduced birthrate and fledgling survival at Wood Buffalo may also be due to the birds arriving in Canada in an extremely weakened condition.

77. The FWS became so concerned about the food shortage for the Cranes that it began a program of supplemental feeding using game feeders dispersing whole kernel corn during the latter stages of the winter of 2008-2009.

78. The supplemental feeding appears to have been helpful to the Cranes by reducing the energy stress they were under from the shortage of natural foods.

79. In spite of these extraordinary efforts by FWS, unprecedented numbers of Cranes still died.

D. TCEQ's Role

80. The primary cause of this massive Crane mortality was the failure of the Defendants to ensure sufficient freshwater inflows into the San Antonio Bay estuary and the bay ecosystems and marshes adjacent to the Refuge.

81. For many decades the Defendant TCEQ Commissioners have issued permits to use water in the Guadalupe and San Antonio River basins and have overseen the diversion of water under those permits as well as from exemptions from permitting created under Texas law.

82. All Defendants have allowed these diversions to be maintained, and water used, without consideration of the need of the Whooping Crane for freshwater inflows to the San Antonio-Aransas Bay system, and without consideration of the overall health of the bay and estuary ecosystem upon which the Whooping Crane depends.

83. Defendants continue to allow the use of water from the San Antonio and Guadalupe River systems and ignore the issue of environmental flows and protection of the Whooping Crane during its oversight of these existing permitted and unpermitted diversions.

84. The water resources of the Guadalupe and San Antonio river basins are at the same time over-allocated and mismanaged by Defendants.

85. Although the drought during 2008-2009 would have caused naturally low freshwater inflows, these flows have been further and significantly reduced by the activities the Defendants authorize and oversee.

86. Defendants have acted, and failed to act, regarding water uses, with complete disregard to the requirements of the Whooping Crane in violation of the ESA.

E. Low Freshwater Inflows Cause High Bay Salinity

87. Most freshwater inflows to San Antonio Bay come from the Guadalupe and San Antonio Rivers, which join approximately 10 miles before entering San Antonio Bay on the Texas coast.

88. Historically, the Guadalupe and San Antonio Rivers have supplied over 79% of the total freshwater inflows into this estuary. The gauged areas of the Guadalupe River alone accounted for 57% of the total freshwater inflows into the estuary.

89. Freshwater inflows play a vital role in sustaining the estuarine ecosystem, mixing with seawater to create brackish conditions, that is, water with salinity less than that in the Gulf of Mexico, which is about 32 parts per thousand (ppt).

90. Many commercially and recreationally important species rely on the lower salinity conditions of estuaries for at least some portion of their life cycle.

91. All estuarine organisms have a range of salinity concentrations that they can tolerate based on their ability to regulate concentrations of internal body salts relative to environmental salinity.

92. Excessive salinity, beyond an organism's zone of tolerance, can impair its ability to maintain osmotic balance and trigger metabolic stresses.

93. Freshwater inflows also transport beneficial sediments and nutrients into the bay.

94. As a result of these and many other interactions, the amount and timing of freshwater inflows have huge impacts on the productivity and overall health of the bay.

95. In addition to causing increased salinity, reduced freshwater inflows reduce mixing and stratification of the water column, and allow salt water to penetrate further into the bay, bringing marine predators, parasites and diseases.

96. During wet years, there generally is plenty of water for all water permits users and still adequate freshwater is left to flow into the bay.

97. It is during the drier years that the over-allocation and mismanagement by TCEQ officials becomes particularly harmful to Cranes.

98. During 2008-2009 freshwater flows into San Antonio Bay fell to record low levels.

99. These abnormally low flow rates were evident throughout 2008 and most of 2009, and flows only increased after the rains of October 2009.

100. As a result, measured salinity levels in the bay remained very high for well over a year, starting in July 2008, continuing through the 2008-2009 wintering season, and reaching a high of over 40 ppt near the Aransas National Wildlife Refuge in summer, 2009.

101. In non-drought years, bay salinity is much lower, with higher salinities limited to just a few months duration.

102. Lower bay salinity for the majority of the year is much more favorable to higher blue crab and wolfberry productivity.

103. Existing water diversion activities on the Guadalupe and San Antonio River Basins significantly alter the salinity of the San Antonio Bay system.

104. Potential future full use of existing permits will result in additional reductions in freshwater flows.

105. The salinity of San Antonio, Carlos, Mesquite and Espiritu Santo Bays where the Whooping Cranes spend the winter will continue to be significantly worsened from the natural conditions due to these water diversion activities.

106. During low inflow conditions, the current water diversions and Defendants' management practices have a significant adverse impact, increasing the salinity of the bay system generally as well as those portions of San Antonio, Espiritu Santo, Carlos and Mesquite Bays that are Designated Critical Habitat under the ESA.

107. The TCEQ does not maintain or possess an accounting of all withdrawals from the Guadalupe and San Antonio River systems due to the existence of an exemption from permitting for riparian domestic and livestock use.

108. Water withdrawals from the Guadalupe and San Antonio Rivers during the drought of 2008 and 2009 were much greater than is indicated in official records of such withdrawals maintained by the TCEQ.

F. Low Inflows Reduce Abundance of Blue Crabs to the Detriment of the Whooping Crane

109. The major source of food for the Whooping Cranes at Aransas is the blue crab.

110. Studies have shown a strong correlation between the blue crab population and freshwater inflows.

111. In a year of normal crab abundance, Cranes can consume 7-8 crabs per hour (80 crabs per day), totaling 80-90% of their diet.

112. In contrast, during years of low blue crab abundance, Cranes consume an average of only three crabs per hour (about 35 crabs per day).

113. Although the Cranes are somewhat versatile, and can and do switch to alternate food sources when blue crabs are scarce, the other food sources are inferior because blue crabs provide more protein and fat for far less foraging effort.

114. In the eight-year period from 1993-2001, the USFWS conducted surveys that roughly estimated the number of blue crabs available to Whooping Cranes.

115. Two winters (1993-94 and 2000-01) had lower than normal numbers of crabs.

116. During those winters, seven and six Whooping Cranes died respectively.

117. In the six other winters with normal numbers of crabs, zero to one Crane died.

118. In 2009, FWS reported that "A blue crab count done on April 1st found zero crabs in the marsh.… Overall, these continue to be some of the worst conditions … ever observed for the Cranes at Aransas, with some birds looking thin and with disheveled plumage."

G. Low Inflows Reduce Abundance of Wolfberries to the Detriment of Whooping Cranes

119. In addition to increasing salinity in the bays, reduced freshwater inflows result in an increased salinity in the marshes that provide habitat for the Cranes.

120. During low flows when bay salinity is high, marsh salinity is higher still.

121. Extended periods of increased salinity can result in negative effects on the estuarine marsh plants, particularly wolfberries. Increased salt marsh salinity is negatively correlated with abundance of wolfberries, because high salinities in late summer during the leafing period lead to reduced fruit production.

122. Wolfberries serve as an important food source for the Cranes, especially in November and December when the Cranes first arrive at Aransas.

123. With measured bay salinities remaining above 25 ppt from August 2008 through August 2009, the salinity of the Aransas marshes was also very high for this extended period.

124. The conditions of 2008 resulted in very low production of wolfberry fruit in the Refuge and surrounding marshes during the 2008-2009 winter.

125. The conditions of 2009 resulted in low production of wolfberry fruit in the Refuge and surrounding marshes during the 2009-2010 winter.

H. Low Inflows Reduce the Availability of Drinkable Water to the Detriment of Whooping Cranes

126. For water to be drinkable by Cranes, it must be less than 23 ppt salinity.

127. Usually the Cranes drink the water in the marsh.

128. When the water in the bay or in the ponds of the coastal marsh rises above 23 ppt, the Cranes must fly to other sources of freshwater in order to drink.

129. These flights use up energy, reduce time available for foraging or resting, and potentially make the Cranes more vulnerable to predation in the uplands.

I. The Health, Survival and Recovery of the Cranes is Directly Related to the Freshwater Inflows Regulated and Controlled by Defendants

130. The health and welfare of the Whooping Crane is inextricably tied to freshwater inflows, bay salinity and the water management practices of the Defendants.

131. The federal government through the FWS and in cooperation with counterparts in Canada has published the Whooping Crane Recovery Plan (3d. Revision, March, 2007) which confirms the relationship between bay salinity levels and blue crab catch rates.

132. The Recovery Plan identifies impacts from low inflows and drought conditions including prolonged food shortage, lack of suitable nearby drinking water, drought-increased susceptibility to predation and disease, and possibly increased mortality during migration due to malnutrition.

133. In this Recovery Plan ensuring freshwater inflows is “priority 1” in the implementation schedule and vital to the recovery of the species.

134. Between 1988 and 2009, years in which higher Crane mortality was observed were always characterized by low inflows from the Guadalupe and San Antonio Rivers.

135. A Crane response to low river flow (*i.e*. high salinity) is one of excess stress due to a number of ecological factors including food availability and the necessity to travel for freshwater.

136. Low freshwater inflows result in increased bay salinity, and reduced bay productivity.

137. The reduced availability of preferred and more nutritious food sources in the marshes (*i.e*. blue crabs) cause the Cranes to alter their feeding behavior and seek out less optimal foods.

138. Cranes expend more energy searching for other food sources and more frequently have to fly to upland areas in search of food and freshwater.

139. Cranes therefore must fly further, forage longer and end up with less nutritional food.

140. This situation results in the Cranes experiencing a negative energy balance, which if maintained over a longer period, results in malnutrition, weight loss and emaciation.

141. Malnutrition, weight loss and emaciation can lead to increased Crane mortality due to predation and disease.

142. Creating conditions that result in malnutrition, weight loss and emaciation of Cranes is harm and harassment.

143. The Cranes' stressed condition does not necessarily lead to death but may also be manifested as lack of sufficient body fat and protein that will be exhibited during the spring migration and subsequent poor reproductive behavior.

J. State Regulatory Mechanisms Harm and Harass Whooping Cranes

144. The Defendants regulate water diversion and use in Texas and control the appropriation, transfer and use of water by permits (including emergency curtailments).

145. The Defendant TCEQ Commissioners formally authorize some water diversion and use by issuing to the holder a Certificate of Adjudication or a Water Right Permit, which contains the limits, a priority date, and any special or unique conditions associated with its use.

146. TCEQ also allows withdrawals for riparian domestic and livestock use, of up to 200 acre-feet per year without any permit, the so-called "exempt" withdrawal.

147. There is no record keeping associated with these so-called "exempt" water withdrawals.

148. Defendant Commissioners have the ability to set policies regarding the acceptance and processing of water permits and the oversight of both exempt and permitted withdrawals.

149. Defendant Vickery and his employees accept and process water permit applications, conduct administrative and technical reviews, issue the draft permit, propose regulations and have continuing oversight over all permits approved by the TCEQ.

150. Defendant Segovia is appointed by the TCEQ to administer the Guadalupe and San Antonio River (among others) water use. Although he has some authority to allocate the water among permit holders and exempt users to ensure that the use of water does not exceed certain limits, TCEQ does not ever take into account the needs of Whooping Cranes.

151. There is a causal relationship between the regulatory program administered by Defendants regarding water diversion and water use on the San Antonio and Guadalupe Rivers and the plight of the Whooping Crane.

152. Decisions by Defendants determine river flows and salinity, which affect the ability of the estuary ecosystems to produce the food required by the Cranes.

153. As a result food sources are directly and negatively impacted by the management and oversight of water permits by Defendants.

154. The actions of Defendants allow water to be taken during times of low flows when the impacts of these programs most directly affect the food and water sources of the Whooping Crane.

155. Defendants have not sought or obtained any Incidental Take Permits covering Whooping Cranes from USFWS.

156. Defendants have not proposed or promulgated regulations that would avoid prohibited takes.

157. Defendant TCEQ Commissioners have not instructed their employees, the Watermaster, the existing water permit holders or any other person to undertake steps to avoid prohibited takes of Cranes.

158. Defendants approve water diversions and uses that harm and harass Whooping Cranes.

159. Defendants are likely to continue approving water diversions and uses that harm and harass Whooping Cranes.

160. No existing state process, regarding existing permits or exempt uses, in which any Defendant is a participant in fact adequately or fully considers the freshwater inflows required by the San Antonio Bay to maintain resources important to prevent takes of the Whooping Crane.

161. TCEQ does participate in a process to evaluate future freshwater flows pursuant to state Senate Bill 3. The enabling legislation for Senate Bill 3 specifically prohibits TCEQ and anyone else from using this process to reduce or otherwise modify existing diversions and uses of water, whether permitted or exempt. *See* Section 1.27 of Acts 2007, 80th Leg., ch 1430. Thus the Senate Bill 3 process cannot protect Cranes from low freshwater flows such as already have occurred.

162. Although the South Central Texas Regional Water Planning Group ("Region L") engages in regional water planning activities pursuant to state Senate Bill 1, it has no authority to limit water diversion or use with respect to permitted or exempt withdrawals and no authority to ensure freshwater flows needed for the Whooping Cranes. Thus the Senate Bill 1 process cannot protect Cranes from low freshwater flows such as already have occurred.

163. The Edwards Aquifer Recovery Implementation Plan and its proposed Habitat Conservation Plan do not control or regulate surface water diversion activities whether permitted or exempt.

164. Whatever authority Defendants have, they have never exercised it to protect Whooping Cranes.

165. Defendants have systematically failed to protect, and failed to prevent takes of the Whooping Cranes.

166. No existing state process will remedy or avoid the harm, harassment and takes of Whooping Cranes described above, nor redress the injuries suffered by Plaintiff and its members.

K. Commercial water suppliers and others seek to use TCEQ's deficient and flawed regulatory scheme to accelerate commitments for and overdraw freshwater in the Guadalupe River basin

167. After the record Crane mortality of 2008-2009, the largest commercial water supplier in the Basin, the Guadalupe-Blanco River Authority ("GBRA"), submitted a new water permit application for 189,000 acre-feet of water per year to be diverted from the Guadalupe and sold to upper basin users.

168. After the Plaintiff's Notice of Intent to Sue letter was made public, the GBRA responded to the threatened litigation by renewing a long-term commitment to provide 75,000 acre-feet of water annually from an existing water permit to Exelon Corporation for a new nuclear power plant proposed in the lower basin.

169. If the Exelon plant is eventually constructed, the additional 75,000 acre-feet of diverted water will significantly increase the likelihood of future takes of Cranes.

170. Defendants have done nothing and have no plans to do anything to prevent the takes that will result from the use of the water by Exelon.

171. The situation with Exelon water permit underscores the point that the TCEQ officials have taken no action and have no plan for preventing continued excessive use of water within the Guadalupe and San Antonio River systems to the detriment of the Whooping Crane.

172. Only the intervention of the Federal Court imposing the protections afforded by the Endangered Species Act will avoid a continuing "take" of the Whooping Crane.

VI. CAUSES OF ACTION

173. Plaintiff incorporates by reference the foregoing pleadings in each count below.

Count I: Declaratory Relief

174. Plaintiff and Defendants have an actual, substantial, legal controversy concerning the force of the Endangered Species Act, important aspects of which are detailed above.

175. Section 9 of the ESA prohibits the "taking" of any endangered species. 16 U.S.C. § 1538(a)(1)(B). "'Take' is defined in ... the broadest possible manner to include every conceivable way in which a person can 'take' or attempt to 'take' any fish or wildlife." S. Rep. No. 307, 93d Cong., 1st Sess. (1973), reprinted in 1973 U.S.C.A.A.N. 2989, 2995. Taking includes the concepts of "harm" and "harassment." 16 U.S.C. § 1532(19). Harm may occur through significant habitat modification that actually kills or injures a protected species by impairing essential behavior patterns, including breeding, feeding or sheltering. 50 C.F.R. § 17.3. Harassment may occur through an act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns such as breeding, feeding, or sheltering. 50 C.F.R. § 17.3.

176. All Defendants are persons subject to the ESA take provision, 16 U.S.C. § 1538(a), and subject to the ESA citizen suit provisions, 16 U.S.C. § 1540(g).

177. Defendants do not hold an incidental take permit or enjoy any other exemption authorizing take of Whooping Cranes.

178. Water diversion activities from rivers that flow into bays affecting Whooping Cranes cannot lawfully proceed without obtaining Defendants' review and approval and without complying with any restrictions imposed by Defendants as part of that review and approval.

179. Defendants' review and approval is a proximate cause of the water diversions activities from rivers that flow into bays affecting Whooping Cranes that, due to lack of needed restrictions, already have resulted in a take of the endangered Whooping Cranes, and are likely in the future to cause additional takes, all in violation of the ESA.

180. Defendants have promulgated regulations and authorized activities that enable the take of Whooping Cranes in violation of federal law.

181. TCEQ regulations or state laws that purport to authorize violations of Section 9 of the ESA, 16 U.S.C. § 1538, are preempted by federal law and are invalid under the Supremacy Clause of the United States Constitution.

182. To stop the on-going violation of federal law, Plaintiff seeks a judicial declaration of Defendants' obligations under the ESA pursuant to 28 U.S.C. § 2201 & 2202.

Count II: Defendants Authorized Activities that Resulted in Crane Takes Without an Incidental Take Permit

183. The Crane mortality of the 2008-2009 winter, due to actions and inactions of Defendants, constitutes a "take" of an endangered species and therefore a violation of Section 9 of the Endangered Species Act.

184. During the same time period, the significant modification of suitable Crane habitat, including designated critical habitat, constitutes a 'harm' under the ESA because it significantly impaired essential Crane behavioral patterns.

185. These takes occurred as a proximate result of TCEQ officials' authorization and implementation of water permits, and is thus prohibited by the ESA unless the TCEQ officials have a permit allowing the take.

186. Throughout the drought period of 2008-2009 the Defendants continued to allow water permit holders and exempt users to divert and consume water from the Guadalupe and San Antonio River basins.

187. These diversions reduced the freshwater inflows into San Antonio Bay, which, during the drought period of 2008-2009, resulted in longer periods of very high salinities than would have been the case had these diversions not occurred.

188. There is a direct link of causation between the activities of the Defendants and the prohibited takes of Cranes.

189. Therefore the activities of the Defendants have violated and continue to violate Section 9 of the ESA.

190. No permit authorized an incidental take by any Defendant.

191. Unless enjoined by the Court, Defendants will continue taking Whooping Cranes in violation of Section 9 of the ESA, 16 U.S.C. § 1538, by approving water diversions that authorize other persons to harm or harass Whooping Cranes.

Count III: Defendants Continue to Authorize Activities that are Reasonably Certain to Cause Significant Habitat Modification and Therefore Harm and Harass Cranes Without an Incidental Take Permit

192. Water diversions authorized by the Defendants have a dramatic impact on salinity levels in the bay.

193. During periods of drought or low flows, diversions of water from the river will result in increased salinity in the bay.

194. Significant alterations to the ecosystem of the bay and marshes are caused by extended periods of high salinity levels beyond that which would result under natural conditions.

195. High bay salinity causes reduced abundance and availability of blue crabs, potentially reduced availability of wolfberries and reduced availability of nearby suitable drinking water.

196. These impacts are significant modifications of the habitat used by Cranes, including designated critical habitat, and are therefore a 'take' because they harm and harass the protected species. 50 C.F.R. § 17.3.

197. No permit authorizes an incidental take by any Defendant.

198. Therefore the activities of the Defendants have violated and continue to violate Section 9 of the ESA.

199. Unless enjoined by the Court, Defendants will continue taking Whooping Cranes in violation of Section 9 of the ESA, 16 U.S.C. § 1538, by approving water diversions that authorize other persons to harm or harass Whooping Cranes in the manner described above.

Count IV: Future Takes of Whooping Cranes are Reasonably Foreseeable and Must be Enjoined Under the ESA

200. The Defendants' current water permit regulations and practices not only have failed to avoid prohibited takes of Cranes, they are highly likely to cause future takes.

201. The future use of existing water permits and exemptions, especially when drought occurs – as it inevitably will – likely will result in impacts much more severe than those exhibited during the 2008-2009 wintering season.

202. No existing state process will ensure sufficient freshwater flow to avoid takes of Cranes.

203. No existing state process will remedy or avoid the harm, harassment and takes of Whooping Cranes described above, nor redress the injuries suffered by Plaintiff and its members.

204. It is reasonably foreseeable that future use of existing water permits and exemptions authorized by Defendants will result in additional prohibited takes of Whooping Cranes unless and until such activities are enjoined.

205. Water use activities authorized by Defendants are so likely to result in prohibited takes of Whooping Cranes that they must be enjoined under the ESA.

VII. STANDING

206. Plaintiff TAP has standing to bring this case. TAP's mission is the research, development and publication of proposals to protect the Whooping Cranes, other endangered and threatened species, and the health of streams and estuaries in the Aransas, Texas area, including but not limited to Aransas, St. Charles, Copano, Port, Mission, Carlos, Mesquite, San Antonio and Espiritu Santo Bays and the Guadalupe, San Antonio, Aransas and Mission Rivers. These activities include monitoring and protecting endangered and threatened species such as the endangered Whooping Crane; increasing public awareness and understanding of environmental issues in the Aransas, Texas area, such as the role and importance of freshwater inflows to the bays and estuaries, through media and other educational programs; participating in common law or statutory based litigation designed to further these activities; researching and publishing information about these issues to inform the public; and reviewing and commenting upon existing practices which impact these issues. This litigation is germane to TAP's mission.

207. Many TAP members are active birders and devote substantial time and effort to observing the Whooping Crane and other birds in their natural habitat. Organizations that are

members of TAP hold or sponsor field trips to the Aransas National Wildlife Refuge and adjacent areas of San Antonio estuary to accommodate their members and customers interests in observing and photographing Whooping Cranes and other wildlife in their natural habitat. TAP and its member organizations also sponsor educational and scientific research activities that involve the study of Whooping Cranes and other wildlife in their natural habitat. Members of TAP reside and work in the Aransas area, and for some their livelihood depends in large part upon the Cranes, and the livelihood of others depends upon healthy and productive estuaries and bays. TAP and its members intend to continue all of these activities in the future. Aesthetic, recreational, economic, professional, and other interests of TAP and its members in observing, photographing, studying, protecting and otherwise enjoying Whooping Cranes and other wildlife in their natural habitat are impaired by the destruction and alteration of Whooping Crane habitat, and the harm and harassment to Whooping Cranes resulting from Defendants' violations of the ESA. The relief sought in this lawsuit can redress the injuries to these interests.

208. TAP members include (among others):

a. Al and Diane Johnson, who own and operate the Crane House, St. Charles Bay, Aransas Co., Texas (http://www.cranehouseretreat.com). The Crane House borders the Lamar Unit of the Aransas National Wildlife Refuge and is a favored location for artists, writers, birders and photographers. Each year during Crane season (Nov-Apr) their business rents space to birdwatchers and others visiting Aransas specifically to see the Whooping Cranes. The Johnsons and their guests regularly see Cranes on the property itself, as well as on the adjacent Refuge lands. The Johnsons have placed 634 acres in a conservation easement, and actively manage their land for Cranes and other wildlife. The Johnsons provided supplemental sources of freshwater during the drought specifically for

the Cranes. The Johnsons' economic future will be seriously harmed if the Crane population declines.

b. Mr. Tommy Moore captains the 'Skimmer', a tour boat that takes visitors to see the wildlife in and around the Refuge. Mr. Moore conducts bird watching boat tours throughout the year, but his busiest time is during the Whooping Crane season (http://www.whoopingcranetours.com). Mr. Moore's boat will take approximately 4000 paying visitors to see the Cranes each season. Each visitor will spend at least $125 each during their visit, including accommodation, boat trip, food and other expenses, all benefiting Mr. Moore, other businesses and the local economy. It is estimated that Mr. Moore's visitors contribute $500,000 to the local economy each year. Mr. Moore will suffer considerable loss of business and economic harm if the Crane population declines. Mr. Moore is himself a birdwatcher and will suffer additional harm if he is unable to view the Cranes during his trips.

c. Aransas County is a corporate and political body created pursuant to Art. IX, Section 1 of the Texas Constitution. In their Regular Meeting of October 12, 2009, the Commissioners Court of Aransas County voted unanimously to become a member of TAP. Aransas County is proud to be the home of the Aransas National Wildlife Refuge and the Whooping Cranes. The County has a significant economic interest in the welfare of the Cranes. Tourism brought in $97.2 million to the County's economy in 2008. The County and the local cities each recover 1% of the state sales tax which contributes significantly to the local budgets. The County estimates that for each $100 in tax revenue, $26 comes from tourists, many of whom visit specifically for the Cranes. It is estimated that the 70-80,000 visitors that come to the Refuge each year contribute some $5 million

to the local economy each year. Aransas County itself, and citizens residing there, whose interest the County represents, are injured by Defendants' violations of the ESA.

d. Aransas Bird & Nature Club ("ABNC") is a local, grass-roots organization dedicated to the effort of improving our stewardship of the natural world entrusted to our care, with a special interest in ornithology. The ABNC accomplishes this goal by increasing local awareness of the natural world with monthly meetings and field trips for its members and the public to observe birds and other wildlife including the highlight of Whooping Cranes, by fostering birding with the community, and providing a positive force to protect birds and preserve habitat. In addition, ABNC assists other local and national organizations in conservation efforts. The ABNC is a membership organization and has members who are injured by Defendants' violations of the ESA. Debra Corpora is president of the ABNC, has a house in Aransas County, and she has a strong recreational interest in the birds and other wildlife of the area. She has observed the Cranes at Aransas and has plans to visit the Refuge again.

e. International Crane Foundation ("ICF") is an organization that works worldwide to conserve Cranes and the wetland and grassland ecosystems on which they depend. ICF is dedicated to providing experience, knowledge, and inspiration to involve people in resolving threats to these ecosystems. ICF staff and members travel worldwide to see all species of Cranes, including Whooping Cranes, and to promote their conservation. ICF is a membership organization and has members who are injured by Defendants' violations of the ESA.

209. As described above, Plaintiff TAP and its members have suffered injury to their economic, environmental, and recreational interests uniquely entwined with the endangered

Whooping Crane, the San Antonio Bay and surrounding wetlands, as well as other birds and animals living in, travel through, and otherwise using this unique habitat.

VIII. PRAYER

WHEREFORE, Plaintiff respectfully requests that this Court grant the following relief:

A. Declare that Defendants Shaw, Garcia, Rubinstein, Vickery and Segovia violated Section 9 of the ESA, 16 U.S.C. § 1538, between 2008 and 2009 by actions and inactions that allow persons to conduct water diversion activities that caused the death of many endangered Whooping Cranes;

B. Declare that Defendants Shaw, Garcia, Rubinstein, Vickery and Segovia are violating Section 9 of the ESA, 16 U.S.C. § 1538, by issuing water permits and authorizing water diversions that allow persons to conduct water diversion activities even when those activities (1) result in significant modification and destruction of Whooping Crane habitat which actually injures or kills Whooping Cranes by significantly impairing their essential behavioral and feeding patterns, and (2) harass Whooping Cranes to such an extent as to significantly disrupt their normal behavioral and feeding patterns;

C. Declare that water diversion regulations promulgated by Defendants Shaw, Garcia, Rubinstein and Vickery are preempted by federal law and are invalid under the Supremacy Clause of the United States Constitution when they purport to authorize water diversions even when those activities (1) result in significant modification and destruction of Whooping Crane habitat which actually injures or kills Whooping Cranes by significantly impairing their essential behavioral and feeding patterns, and (2) harass Whooping Cranes to such an extent as to significantly disrupt their normal behavioral and feeding patterns;

D. Enjoin Defendants and their employees and agents from approving or allowing water diversion activities that destroy or alter Whooping Crane habitat until the State provides

reasonable assurances that State-authorized water diversion activities will not take Whooping Cranes in violation of the ESA;

E. Enjoin Defendants and their employees and agents from approving or processing new or pending water permits absent sufficient assurances that future water diversion activities will not take Whooping Cranes in violation of the ESA;

F. Order Defendants to compile an inventory of all water withdrawals under the livestock and domestic use exemption and to develop a process for a complete accounting of all water withdrawals from the Guadalupe and San Antonio River systems;

G. Order Defendants to conduct a thorough analysis of all permitted and exempt withdrawals and develop a binding plan for water development and water use in the San Antonio and Guadalupe River basins sufficient to protect Whooping Cranes and their vital habitat, which may include reduction of existing water uses or addition of special conditions to existing permits;

H. Order Defendants to develop an approved Habitat Conservation Plan for the San Antonio and Guadalupe River basins and San Antonio Bay, including provisions to reduce all withdrawals during low flow conditions to such an extent necessary to prevent harm and harassment of the Aransas-Buffalo Wood Whooping Crane flock;

I. Appoint a Special Master to oversee the development of the plans, studies and activities necessary to implement this order;

J. Maintain jurisdiction and oversight over this matter until the Habitat Conservation Plan is approved and implemented and an Incidental Take Permit is issued by USFWS;

K. Award Plaintiff its costs and reasonable attorneys' fees, including expert witness fees, as authorized by the ESA, 16 U.S.C. § 1540(g)(4); and

L. Award such other relief as this Court deems just and appropriate.

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