Interim Report
to the 86th Texas Legislature

House Committee on Agriculture and Livestock

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HOUSE COMMITTEE ON AGRICULTURE AND LIVESTOCK
TEXAS HOUSE OF REPRESENTATIVES
INTERIM REPORT 2018

A REPORT TO THE
HOUSE OF REPRESENTATIVES
86TH TEXAS LEGISLATURE

TRACY O. KING
CHAIRMAN

COMMITTEE CLERK
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Committee On
Agriculture and Livestock

January 7, 2019

Tracy O. King
Chairman

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The Honorable Joe Straus
Speaker, Texas House of Representatives
Members of the Texas House of Representatives
Texas State Capitol, Rm. 2W.13
Austin, Texas 78701

Dear Mr. Speaker and Fellow Members:

The Committee on Agriculture and Livestock of the Eighty-fifth Legislature hereby submits its interim report including recommendations and drafted legislation for consideration by the Eighty-sixth Legislature.

Respectfully submitted,

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AGRICULTURE AND LIVESTOCK

POLLINATOR CONSERVATION IN TEXAS

Study the effects of declining migratory species, such as the monarch butterfly, as well as native and domesticated bee populations on agricultural production and its economic impact on the state. Identify possible causes of the population changes and monitor national trends. Make recommendations on how to improve and promote monarch butterfly and bee populations and habitats in the state.

Monarch Butterfly Populations

Each fall, monarchs that breed east of the Rocky Mountains in the northern United States and southern Canada undertake a vast migration to the Oyamel fir forests in the mountains of central Mexico. Due to its strategic placement on the migratory path, Texas serves as a crucial component in the eastern North American Migrating Monarch's life cycle. Texas is key to providing monarchs with much needed nectar and lipids as fuel to complete their journey to Mexico and enter a hibernating condition called "diapause" during the winter months.

Those monarchs that survive the winter months begin their journey back north through Texas around late February of the following year. These monarchs are known as the first generation. Due to their short life spans, it takes up to 4 generations to complete a full year of their migration. As they travel back up through Texas, the generation female monarchs plant their eggs on milkweed plants along the way. This is called the Spring Range. As first generation monarchs die off, the second generation emerges and continues the journey north. This is called the Summer Breeding Range.

During the Summer Breeding Range, monarchs reside throughout the northern United States and southern Canada in most places where milkweeds, their sole host plants, are available for the females to lay their eggs. 2 or 3 more generations of monarchs will emerge during this range. Those generations of monarchs and their larvae face harsh conditions in the summer months, with threats including insects and birds, bad weather, and habitat destruction. Afterwards, the final generation of monarchs will fly south to Mexico in August or September, beginning the cycle once again.

The monarch butterfly has significantly declined in population since the 1990s when overwintering numbers topped 1 billion in the Oyamel forests in Mexico. The overwintering numbers hit an all time low of 35 million in the winter of 2013-2014. These declines were so severe that a group of biologists petitioned the U.S. Fish and Wildlife Service to list the North American monarch as a threatened species under the U.S. Endangered Species Act (ESA) in August 2014, triggering the mandatory 90-day finding, the U.S. Fish and Wildlife Service then determined that the petition held sufficient merit for a 12-month review of the species. As part of the review, the USFWS will conduct a Species Status Assessment (SSA) to evaluate the status of monarch populations globally. The recent overwintering estimates confirm a significant increase since the winter of 2013-2014, however the species continues to experience a downward trend.

The latest estimates from Texas A&M University show that the overwintering numbers totaled 124 million monarchs in the winter of 2017-2018.

The decline of the monarch population is due to multiple factors including:

- Illegal logging in the Oyamel fir forests in Mexico;
- Extreme weather conditions in overwintering and breeding grounds;
- Decline in milkweed and nectar-producing plant availability in the Midwestern breeding grounds;
- Habitat Loss and Fragmentation;
- Disease; and
- Herbicide and Insecticide Use.

After the 2014 petition to list the monarch as a threatened species, stakeholder groups, state agencies, academics, private industry, and citizen activists have come together to implement several studies and programs to keep the monarch off this list. Since the monarch is a migratory species and covers up to 2,500 miles a year, there is not one state or country that can take ownership of this species' sole habitat.

The Midwest Association of Fish and Wildlife Agencies (MAFWA) is made up of state fish and wildlife agencies, other conservation organizations and stakeholders from Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota, and Wisconsin. In June 2018, MAFWA included the states of Arkansas, Oklahoma, Texas and member states of the Northeast Association of Fish and Wildlife Agencies in their final Mid-America Monarch Conservation Strategy for 2018-2038. This Strategy is a collaborative effort to reverse monarch population decline through their entire migratory route within the United States.

As a result of discussions and conversations over the past year, a group of stakeholders formed the Texas Monarch Consortium to develop the Texas Monarch Conservation Plan. This working group is made up of professionals from federal and state agencies, non-profit organizations, and the private sector. Due to the tight deadlines of the U.S. Fish and Wildlife Service's status review and associated Species Status Assessment (SSA), the Consortium's executive committee plans to complete a draft in fall 2018. The Plan will build upon the Mid-America Strategy, while tailoring their actions to specific monarch conservation issues unique to Texas.

Federally, the U.S. Fish and Wildlife Service released their Monarch Conservation Database on June 13, 2018, where stakeholder groups (such as MAFWA and the Texas Monarch Consortium) across the United States can submit detailed reports on their Monarch conservation efforts. The Service will review all of these reports in accordance with the *Policy for Evaluation of Conservation Efforts when Making Listing Decisions* (PECE) guidelines in the Federal Register and utilize them in their final listing decision. The Service is legally required to submit to the Federal Register a 12-month finding on the ESA status for the monarch butterfly by June 30, 2019.

On July 18, 2018, the Texas Parks and Wildlife Department put forth that there is much uncertainty as to what will happen in Texas if the Monarch butterfly is to be listed. They suggested that a 4(d) type rule may be implemented in that situation to allow for involuntary take of that species for some activities, such as a car driving down the highway and hitting a monarch. However, there is no concrete answer as to the ruling and impact of a potential listing on the State of Texas.

Due to the uncertainty of the decision and overall concerns of population declines, several government, non-profit, and private sector organizations have taken on various conservation efforts to preserve and promote monarch butterfly populations within Texas.

Economic impact from the monarch butterfly on crops in the United States is difficult to determine, but when combined with other pollinator species, is significant. In Mexico, economic impact from the monarch comes in the form of tourism dollars during the winter months. JM Butterfly B&B in Macheros, Mexico is one example of a family owned hotel and ecotourism service that is benefitting from the monarch's migration.

Native and Domesticated Bee Populations

Native and domesticated insect pollinators including monarch butterflies, western honey bees, and other native species of bees, butterflies, moths, beetles, wasps, and flies provide an important service pollinating native plants and agricultural crops. In 2016, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) estimated that animal pollinators enhance global crop output by an additional $577 billion annually. In a letter dated August 1, 2013, the United States Department of Agriculture estimates that insect-pollinated agricultural commodities result in significant income for agricultural producers and account for over $20 billion in annual U.S. agricultural production. The Texas Parks & Wildlife Department estimates that native bees are responsible for $3 billion a year in U.S. agriculture. Finally, native bees and other insect pollinators are critical to our native ecosystems that in turn support major outdoor and nature-based economies like hunting and wildlife viewing. In 2016, the United States Fish and Wildlife Service published their National Survey of Fishing, Hunting, and Wildlife-Associated Recreation estimating that hunters and wildlife watchers in this country spend upwards of $102 billion annually.

In Texas, both domesticated and native bee populations have been declining over the last decade. Disease, parasitism, and interactions between threats have also been cited as major factors leading to bee declines.

The Texas Apiary Inspection Service of Texas A&M AgriLife Research (TAIS) conducts routine inspections of migratory bee keeping operations to mitigate the presence of honey bee pests and diseases, as well as permits the movement of hives within the state and across state lines. The apiary industry of Texas is largely comprised of migratory operations that provide honey production and pollination services. According to the United States Department of Agriculture National Agricultural Statistics Service (USDA NASS) there were 120,000 honey producing

colonies in Texas over the course of 2017. These colonies produced 7,920,000 pounds of honey with a production value of $16,711,000.

Since the 1950s, there has been a steep decline in the number of managed honey bee colonies in the U.S. from 5.9 million colonies in 1947 to 2.3 million in 2013. According to the Bee Informed Partnership's national survey, Texas experienced a total honey bee colony loss of 34.5%, which is slightly less than the national loss of 40.1%. TAIS tests for American Foulbrood, Nosema (*Nosema spp.*), and Varroa mite to mitigate the presence of pests and diseases in the Texas apiary industry.

Varroa mites, indigenous to Asia, were accidentally introduced into the United States in the 1980s and have since spread across the country. They are an ectoparasite that live on and interact with the environment via their host. While they do not kill adult honey bees, they can weaken the host lifespans and will ultimately kill the colony by outcompeting their host. Nosema is a gut microsporidian that can cause honey bee digestive issues and weaken the worker force of a colony.

Another cause of honey bee decline is Colony Collapse Disorder (CCD), which was first reported in 2006. It is a phenomenon that occurs when a majority of worker bees in a colony disappear, leaving behind the queen, nurse bees, and baby bees. Without the worker bees to bring back nectar and pollen, the colony collapses. Scientists have been studying CCD since its' inception and believe that a combination of factors including pollution, Varroa mites, and pests contribute to this phenomenon.

Pesticide exposure to pollinators continues to be an area of research and concern, particularly the systemic pesticides such as neonicotinoids.

Over 700 native species of bees call Texas home, and 17 are listed as Species of Greatest Conservation Need (SGCN) by the Texas Parks & Wildlife Department. Texas lays claim to 9 different species of Bumblebees, the most recognized and familiar native bee in Texas. A 2015 study from the USDA funded Integrated Crop Pollination Project suggests that there is growing evidence that wild, unmanaged bees can provide effective pollination services where sufficient habitat exists to support their populations. They can also contribute to the long-term stability of crop pollination, thereby reducing the risk of pollination deficits from variable supply or activity of honey bees.

Along the Texas Gulf Coast, cotton fields were shown to be pollinator-limited, and researchers estimated potential gains of $108 per acre per crop with increased native pollinator populations. Native insects can be the primary pollinator of some crops, and nearly 80% of native plants require insect pollination. When the importance of native plants in rangelands and for nature-based economies (e.g. hunting and nature tourism) are considered, the services provided by native insect pollinators rises to over $71 billion / year.

Reasons for native bee decline include competition with domesticated honey bees and habitat destruction. Native bees are the primary pollinators of native plants in Texas and more effective and efficient at pollinating certain crops, such as blueberries, melons, squashes, and tomatoes.

An accurate tally of the total native bee population that occurs in Texas is not yet available and little data exists on the factors that affect their population. In Texas, however, some pollinator populations may be stable relative to other parts of the country. In northeast Texas, for example, researchers have recently documented persistent populations of several species of bumble bees. This could be due to the prevalence of native and semi-natural range lands in the state that, when managed correctly, can provide high-quality pollinator habitat.
Honey bee monopolization of food resources can displace native bees to less preferred plant species, suppress reproductive success, and reduce abundance. Additionally, in contrast to above-ground colonies, 70% of native bees are ground-nesting bees. When the soil is disturbed through aggressive mowing, construction, or any other activity involving their nests, their habitat is lost.

Pollinator Conservation Efforts

Texas Parks and Wildlife Department

To promote conservation and management actions that benefit monarchs and other native insect pollinators, the Texas Parks and Wildlife Department (TPWD) has produced a statewide monarch and native pollinator conservation plan and management recommendations for native insect pollinators. The management recommendations document is specifically produced for the benefit of landowners seeking agricultural tax valuation for wildlife management and discusses how the seven qualifying wildlife management practices utilized in wildlife management plans can be geared specifically for native insect pollinators. As of 2016, over 5 million acres were enrolled in wildlife management plans for agricultural tax valuation. TPWD has been actively engaged in additional state and regional monarch conservation efforts including the Texas Monarch Consortium and the Midwest Association of Fish and Wildlife Agencies' Mid-America Monarch Conservation Strategy.

Finally, TPWD staff works on both private and public lands, to restore habitat that benefits monarchs and native pollinators. Since 2014, TPWD's technical guidance program has been used to enroll over 7 million acres of private lands in wildlife management practices that can benefit monarchs and native insect pollinators (Table 1). Additionally, management activities that benefit native pollinators have been conducted on nearly 300,000 acres of state lands (Table 2), and 2000 acres of high-quality habitat for upland birds, which is also habitat for native pollinators, has been created through their private lands program. Finally, several state parks have interpretive programs that include information and activities related to monarchs and native insect pollinators.

Office of the Comptroller of Public Accounts

In 2011, the Texas Legislature authorized the Office of the Comptroller of Public Accounts to promote compliance with federal law protecting endangered species and candidate species in a manner consistent with his state's economic development and fiscal stability. Since then, the Legislature has appropriated $15 million to fund research through the agency on species of concern, such as those petitioned for listing under the Endangered Species Act like the monarch

or species that are already listed under law. The Comptroller's Office identified the monarch butterfly as one of the priority species for research based on the data gaps for the species in Texas, as well as the potential economic impacts if the species is listed.

Given the importance of this species, they developed a comprehensive monarch research program that is designed to specifically inform the U.S. Fish & Wildlife Service during the Species Status Assessment (SSA) process. The Office of the Comptroller has tasked and funded Sam Houston University, Texas A&M University, Texas A&M University Commerce, and the University of Texas at San Antonio with this research. Final research reports were produced in July 2016 and September 2018, and additional final reports are expected by the end of 2018. All final reports and data are sent directly to the U.S. Fish & Wildlife Service and made available to the public. In addition, in 2015, the Comptroller's Office established a monarch butterfly working group to engage interested stakeholders and provide information about monarch research, conservation efforts and the SSA process.

Texas Department of Transportation

Since 1932, the Texas Department of Transportation (TxDOT) has used native wildflowers and grasses to line the more than 800,000 acres of right of ways in Texas. Their main point of focus is to control erosion issues in the right of ways, but the side benefit allows them to provide food and habitat for pollinators as well. To protect and preserve these investments, TxDOT practices integrated vegetation management. HB 3302 in the 84th Texas Legislature required TxDOT to use regionally appropriate plants in its' rights of way. Each of the 25 regional TxDOT districts has a vegetation manager who oversees proper application of techniques, which vary by region, road type and function. By establishing sustainable vegetation management programs that specifically address wildflower preservation and protection, TxDOT has maintained biodiversity while reducing mowing and maintenance costs.

Passed in 2015, the Fixing America's Surface Transportation (FAST) Act, the current federal transportation reauthorization bill, contains provisions to encourage pollinator habitat and forage on transportation rights of way. As a result, TxDOT entered into the Monarch Highway Memorandum of Understanding with five states (Oklahoma, Missouri, Minnesota, Kansas, & Iowa) to promote pollinator-friendly maintenance practices on roadsides along the IH-35 migration route.

In 2015, TxDOT facilitated a cooperative agreement between the United States Fish and Wildlife Service (USFWS) and the Native Plant Society of Texas (NPSOT) to allow for those entities to plan, establish and maintain monarch gardens at TxDOT Safety Rest Areas. Four such installations are currently operational:

- north and southbound Hill County Safety Rest Areas on IH-35 near Hillsboro; and
- north and southbound Bell County Safety Rest Areas on IH-35 near Salado.

Texan by Nature

Texan by Nature is a non-profit organization founded by former First Lady Laura Bush. They bring business and conservation together for positive impact for our natural resources, people, and economy.

In June 2017, Texan by Nature hosted the South-Central Monarch Symposium--as part of a project funded by the National Fish and Wildlife Foundation. This working symposium brought together 200 conservationists, landowners, and researchers throughout Texas and Oklahoma representing over 80 organizations to discuss the status of efforts underway for recovery of the monarch.

Through the Symposium and subsequent stakeholder meetings, Texan by Nature has discovered the following:

1. Private lands are key to recovery efforts
2. Industry right-of-ways can create corridors of habitat that align with the migratory path of the monarch, and
3. Public and private partnerships are needed to create and implement practical solutions.

Over 95% of Texas lands are privately owned. Effective monarch and native pollinator conservation will require private landowner engagement and involvement. These lands will play a significant role in creating, conserving, and maintaining native pollinator habitat. Thousands of landowners on millions of acres are already engaged in wildlife management. They are key in supporting monarch conservation efforts.

Industry right-of-ways that include oil, gas, utility, rail, and roads create a network of corridors and patches along the migration route through Texas spanning hundreds of miles and thousands of acres. Restoring these lands to native pollinator friendly rangeland would produce hundreds of miles of connective habitat needed by all pollinators.

Enbridge/Valley Crossing Pipeline

Enbridge's Valley Crossing Pipeline is a natural gas pipeline that spans 168 miles beginning in Nueces County down to the City of Brownsville and goes 9 miles offshore in Texas waters. It connects Texas Gas producers with increasing demand markets in South Texas and Mexico for power generation and local distribution.

The pipeline crosses the King Ranch property in Kenedy County. The King Ranch landowners approached Enbridge with an opportunity to utilize a Texas Native Seeds monarch friendly seed mix in their right of way. After speaking with Dr. Forrest Smith of Texas Native Seeds and the Texas A&M Kingsville Caesar Kleberg Institute, they immediately agreed to the idea. They utilized contractor crews to receive the seed mix and deploy it on their right of way property.

They then began approaching other landowners to see if they might be interested in utilizing their seed mix. All of the landowners on their right of way in Kenedy County agreed and the result is an uninterrupted 46 mile monarch corridor on the Valley Crossing Pipeline in South Texas. Enbridge sees their role as being able to provide a financial donation, as well as being able to promote the idea that this great resource exists in Texas. Enbridge's investment in

community programs and projects will positively impact the community and has sparked interest with other industry partners.

Texas Native Seeds

The Texas Native Seeds Program's mission is to develop and commercialize native seed sources for large scale restoration in Texas, and to facilitate the conservation and restoration of native habitats through research and education. Their work began in 2001 as the South Texas Natives Project, and has since expanded throughout Texas as the Texas Native Seeds Program. Texas Native Seeds believes Texas must continue to support efforts to conserve native habitats in our state, on public, but especially on private lands. Additionally, they believe that the greatest limitation to restoration of native habitats to benefit pollinators is the lack of supply of ecologically appropriate native seeds to use in restoration activities.

Texas Native Seeds worked together with Enbridge, the King Ranch, and private landowners in Kenedy County to reseed 46 miles of a new gas pipeline right of way with native plants, including beneficial nectar plants for monarchs and pollinators. This project was made possible because seed supplies of the appropriate plants were commercially available for this region.

TxDOT has been part of the Texas Native Seeds Program for the past two decades. They partnered with Texas A&M University – Kingsville, Tarleton State University, Texas AgriLife Research and Sul Ross State University to develop regionally appropriate native plant seed sources for use by TxDOT and other entities. This work has resulted in 30 new native seed mix varieties and significant advancements in seeding methodology. As a result of this research, seeding specifications have changed for over half of TxDOT's 25 regional districts. TxDOT's actions beneficially impact native seed markets, adjacent lands, and restoration in all sectors, particularly for pollinators.

Texas Wildlife Association

The Texas Wildlife Association is an organization that serves Texas wildlife and its' habitat, while protecting property rights, hunting heritage, and the conservation efforts of those who value and steward wildlife resources. TWA members are stalwart land stewards who rally around the importance of working together to improve and promote healthy ecosystems. They do this by collaborating closely with state, federal, and NGO partners to disseminate information to private landowners through field days, landowner workshops, online web, print, and social media. Additionally, in 2017, the Texas Wildlife Association hosted a Monarch Educator series for 1,035 educators. Those teachers, in turn, potentially reached 172,256 students collectively.