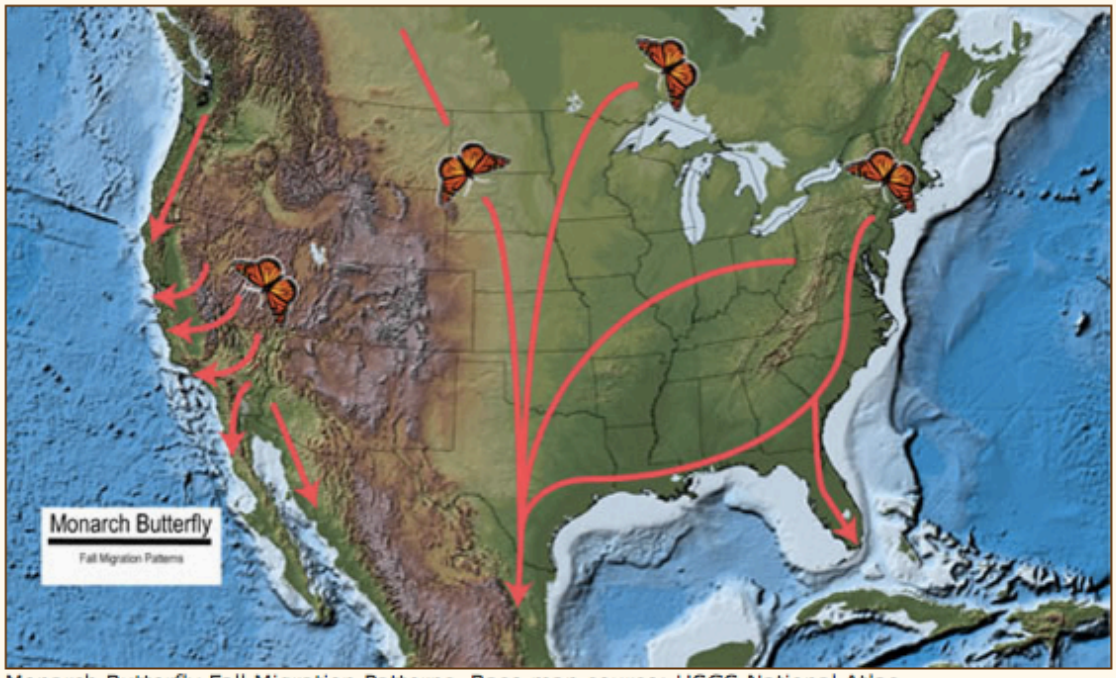
Prepared by Elizabeth Berry, President Loving Garland Green

"Happy 2016" is a rescued Monarch from Garland Texas. This exceptional female eclosed on December 31, 2015 and was released at La Jarra Ranch near Raymondville, Texas a week later. You can read her story from the home page of Loving Garland Green – The Remarkable Story of the Monarch from Garland Texas.
(http://www.lovinggarlandgreen.org/files/1914/5261/2276/The_Remarkable_Story_.pdf)

BUILDING A TEXAS MONARCH WAYSTATION

Just as there are many names for these types of gardens—Butterfly Habitat, Pollinator Waystation, Butterfly Garden, and Monarch Waystation—there is no one-only way to build one. They do have a common purpose, however, and that is to provide a home for insects that pollinate plants. They also follow a few basic principles: 1) The garden must contain host plants for the pollinators' eggs and caterpillars. 2) The garden must contain nectar plants to feed the adults. 3) Plants native to the area are best to use. 4) Plants are installed close together in a cozy design. 5) A variety of nectar plants to ensure blooms from early spring to late November or the first killing frost should be provided.

The choice of host plants depends upon the pollinators to be attracted. Since we are dedicated to attracting Monarchs, we have chosen the milkweed for our host plant. However, if the goal is to attract another species of butterfly such as Gulf Fritillaries, then a Passion Flower vine (Maypop – *Passiflora incarnata*) should be installed, as that is the preferred host plant for the Gulf Fritillaries.



Monarch Butterfly Fall Migration Patterns. Base map source: USGS National Atlas.

Eastern North American monarchs fly south using several flyways then merge into a single flyway in Central Texas.

Why Monarchs and why Texas?

Monarchs (because of their size, beauty, and endangered status) have become the flagship species to call attention to the importance that all pollinators play in the food chain for all living creatures.

Pollinators are responsible for at least 1/3 of all the food we consume and one half of the fats and oils we eat. In addition to that, we use their fibers for our clothing. Populations of the Monarch butterfly (*Danaus plexippus)* have dropped an astonishing 96.5 percent over the past few decades, from an estimated 1 billion in the mid-1990s to just 35 million in early 2014. Conservation groups have been worrying about this decline for several years

Monarch habitats are of particular importance in Texas because this is where Monarchs (our state insect) deposit many of their eggs for the first generation in the spring and also many of their eggs for the fourth generation in late September and throughout October. Northern Mexico and southern Texas are the first places to see milkweed in the spring. Texas is the last place for laying eggs of the fourth generation. In the fall of 2015, we rescued and released 12 from the Garland Community Garden. In addition to these fourth generation Monarchs, other Garland Texas residents released many other Monarchs.

Note: The fourth generation of Monarchs is the last generation each year to be born (eclose). Unlike the first three generations of the year, the fourth-generation Monarchs live six to seven months. The fourth-generation are the ones that migrate to the Mexican highlands and return in

the spring to deposit eggs on milkweed. The first three generations of each year have life spans of two to eight weeks.

Thus south and central Texas are critical areas to ensure a good supply of milkweed for the Monarch caterpillars in the early spring. Here in north Texas, Milkweed often does not begin to appear until the last week of April or the first week of May. As the Monarch's fourth generation from the previous year migrates north from the Mexican highlands (the last week in March/first week in April) they will lay eggs on milkweed leaves for the first generation of the season. Most of these eggs will be deposited in south Texas.

Monarchs belong to a species of about 300 butterflies called "the milkweed butterflies." Here in North America we only have four species of the milkweed butterflies: the Monarch – *Danaus plexippus*; the Queen – *Danaus gillippus*; the tropical milkweed butterfly – *Lycorea cleobaea*; and the soldier butterfly – *Danaus eresimu*s. They will only deposit their eggs on a milkweed plant.

BUILDING A MONARCH WAYSTATION

Butterfly gardens—especially those built on public property such as a nook in a park or as part of a schoolyard project—are built and then quickly fall into neglect. This is understandable as people have a tendency to move on once a project is completed. "There, been there, done that—NEXT" is sometimes the mindset. However, any garden, once begun, is an ongoing commitment. Very rarely can any plant be stuck in the ground and then deserted and be expected to survive—especially here in Texas with our unpredictable and often drought conditions.

Keeping the tendency for neglect in mind, I believe that I may have stumbled on a garden design that will work well for gardens that can naturally go for longer periods of time with much less and perhaps even no watering from the human hand. Of course, as much as possible native plants should be used in these gardens; however, even native plants require some water.

DESIGN

Our design concept for a Monarch Waystation is presented on the last page of this document. While following the basic principles for creating a well-designed butterfly garden such as grouping the plants closely together and including a mix of nectar and host plants, it is also is an experimental design that we expect will work particularly well for meeting water requirements in areas affected by drought. This garden is designed to require very little watering—perhaps as little as once every two weeks or even less. The design is a combination of straw bale and hugelkultur. First a hugelkultur bed will be installed in a U shape. Then straw bales will be placed on top of the hugelkultur. The straw bales will be prepared with water and organic fertilizer and soil. Then the plants will be installed in the straw bales.

LIST OF INDIGENOUS MILKWEED AND NECTAR PLANTS – Native to North Texas

(If you live in an area of the USA other than Texas, and even in areas of Texas other than North Texas, consult native plant lists specific to your area. Many of the plants in the list below may be suitable for your area as well but check to be certain.)

Antelope Horn – *Asclepias asperula*
Green Milkweed – *Asclepias viridis*
Common Milkweed – *Asclepias syriaca*
Turk's Cap – *Malvaviscus drummondii*
Autumn Sage – *Salvia greggii*
Purple Coneflower – *Echinacea purpurea*
Texas Lantana – *Lantana urticoides*
Star Aster – *Symphiotricum oblongifolium*
Bee Balm – Monarda didyma
Indian Blanket – *Gaillardia pulchella*
Wand Milkweed – *Asclepias Viridiflora*
Shepherd's Needle – *Bidens pilosa*
Jupiter's Beard – *Centrantus ruber*
Mountain Sage – *Salvia regla*
Cowpen Daisy – *Erbesina encelioides*
Zinnia
Flame Acanthus
Pentas – *Pentas lanceolata*
Mealy Cup - *Salvia farinacea*
Mexican Bush Sage – *Salvia leucantha*
Pineapple Sage - *Salvia elegans*
Scarlet Sage – *Salvia splendens*
Blackeyed Susans – *Rudbeckia hirta*
Sumer Beauty – *Allium Tanguticum*
Blue Mistflowers – *conoclinium coelestinum*

TASK SCHEDULE AND MAINTENANCE PROGRAM

The following task schedule and maintenance program is one that I have prepared for a project we are hoping to undertake at one of our local schools in February of 2016. It is provided as an example that you may want to modify to suit the specific needs of your group and the space you have to work with.

LAST WEEK FEBRUARY

- Mark off site
- Gather rotten logs and deliver to site
- Purchase 17 straw (not hay) bales [bales are about three feet long two feet wide and two feet high]
- Deliver straw bales to site.

FIRST WEEK OF MARCH

1. Dig a two-foot deep three-foot wide trench where you plan to place the straw bales. [See diagram on the following page.]
2. Place rotten logs in trench and water thoroughly.
3. Add dry organic matter such as leaves on top of logs.
4. Add composted manure
5. Water thoroughly
6. Add green organic waste such as uncooked vegetables.
7. Add dry leaves on top
8. Mix expanded shale with soil you dug out of trench
9. Smooth soil back into/over trench. It may be about six inches high when finished.
10. Place straw bales on top of the amended soil as shown in the diagram.
11. Once they are in place, soak each of the straw bales thoroughly with water.
12. Prepare the straw bales for planting. This process will take about 12 days. We recommend watching this you-tube video on straw bale gardening: https://www.youtube.com/watch?v=UXcA99xGHxQ

THIRD OR FOURTH WEEK OF MARCH

Install the plants in the straw bales. To do this, dig out a hole for the plant, place some garden soil and root stimulant if you like. Cover and water. The prepared straw bale will provide any additional nutrients needed as it has already begun its decomposition process.

LATE APRIL

Plants should be thriving. Have a grand opening to explain your unusual garden to the public.

MAY

This is a time for ongoing maintenance and monitoring of the garden for eggs and caterpillars to rescue. Make sure schedule is in place with stewards identified who will watch over the garden during the summer.

SEPTEMBER/OCTOBER

Reassign responsibilities. Add compost and other soil amendments if needed. Beginning the third week of September, students at your school or members of your organization should be busy rescuing Monarchs. These are particularly important because these are the fourth generation Monarchs who will fly to the Mexican highlands and lay the eggs next spring for the first generation of 2017. Ideally these Monarchs should be tagged.

NOVEMBER

Maintenance work such as cutting back perennial shrubs in the garden is done now. You may also need to put some more garden soil and compost on top of the decomposed straw. Going forward, your garden will no longer have the unusual look of a straw bale garden. However the soil you prepared hugelkultur style will now be providing moisture and nutrients to continue feeding your plants. We predict that you garden in its second, third and fourth years may need no water and no additional nutrients—except in cases of extreme heat and drought. And in those times your garden will not need as much as a traditional garden. However, monitor your garden carefully—especially the first year.

RESCUING AND RELEASING MONARCHS

Here in Garland, Texas, late September and throughout October can be busy and exciting months for the release of Monarchs. Caterpillars and eggs taken from your garden during these months in north Texas are sure to be the fourth-generation Monarchs—the ones that will migrate to the Mexican highlands and return the next year to lay eggs in south and south-central Texas.

Thus, the most exciting part of the Monarch season for our friends in northern Mexico, south and south-central Texas will likely be late March and early April. The caterpillars and eggs found during this time will be the first generation of Monarchs for the year.

RESCUING MONARCHS

It's a good idea to monitor the milkweed leaves and other leaves of host plants if you have them in your garden throughout the growing season (as long as they are green). In north Texas this usually means from late April all the way up to the first killing frost in November. When you find an egg or a caterpillar, remove it from the garden as soon as possible and place it in a container (Monarch Condo). You can purchase these containers from various websites that feature information about Monarchs, or you can purchase a nylon mesh laundry basket locally for about $2.99.

1. Place a small milkweed plant with plenty of healthy leaves in the container. I use tropical milkweed for this purpose because it grows fine in small (about one quart) containers whereas native milkweeds with their big taproots do not. If you only have native milkweed, cut off some branches, put water in a vase and keep the milkweed fresh for the caterpillars. Be sure and keep an eye on them because they eat a lot!.

2. Don't put eggs and caterpillars in the same condo, as the caterpillars will eat the eggs.

3. I would limit three eggs or 3 caterpillars to each condo.

4. Cover the top of the condo with a hand towel. This keeps the caterpillars contained. When they make their pupas, they will attach to this "ceiling" of their condo.

HOW LONG DOES IT TAKE?

The time it takes a Monarch to progress from a speck on a milkweed leaf into its fully realized self will vary according to certain environmental conditions mainly temperature. However, in general, this is what you can expect:

1. The egg stage lasts 3 to 8 days.

2. The larval or caterpillar stage lasts from 9 to 14 days. The caterpillar molts (sheds its skin) five times. The intervals between the molts are called "instars."

3. The pupa or chrysalis stage lasts 8 to 15 days.

RELEASING MONARCHS

Ideally, the monarch should be released from its condo within 24 hours after it has eclosed (emerged from the pupa). [*But not sooner than three hours because it needs time for its wings to dry.*] However, prompt release is not always possible. Speaking from experience I can say that it is possible to keep a Monarch alive and seemingly happy in a nylon-mesh laundry basket for up to one week.

We were forced to do this with "Happy 2016", a female Monarch that eclosed on December 31, 2015. The weather was too cold and wet to release her—certainly in Garland, Texas. However that particular week it was cold and wet in south Texas as well. During this time we fed Happy a diet of cotton balls soaked in organic sugar water; marigold flowers from our yard; and watermelon. She especially seemed to like the watermelon. This monarch did not seem to be stressed at all about being inside the condo. In fact, when it came time to release her near Raymondville, Texas, she was reluctant to leave and took some coaxing.

IDEAL WEATHER FOR RELEASE

Ideally, there should be little to no wind. The day should be dry and sunny with an air temperature above 60 degrees Fahrenheit. Butterflies are cold-blooded. They need the sun. Releasing monarchs in the wind and rain greatly reduces their chances for survival.

WHERE TO RELEASE

Ideally the Monarch should be released in a garden with nectar flowers and bushes for protection. Releasing them in a large open field makes them vulnerable to predators.

HOW TO RELEASE

A rewarding method is to gently push your index finger under the front feet of the Monarch. They will climb on board and then you can lift your hand out of the laundry basket. The Monarchs I've released have all been reluctant to leave my hand. I move my hand near a nectar plant and eventually they will either hop off or fly away.

PUBLICITY

If you are able to schedule an event around the release, this is a great way to educate your community regarding the Monarch and the importance of pollinators to our food chain.

DEALING WITH CONTROVERSY

As with any human endeavor, one can expect controversy. Rescuing Monarchs and building habitats for them can be viewed as interfering with the natural order of things. And yes it is. However, what is being undertaken here are corrective measures to undo damage to the natural order of things due the overuse of herbicides over the past 20 years. Since the 1990's we have seen a 90% decline in the appearance of the Monarch butterfly. Most scientists attribute this decline to

the decrease in the milkweed plant habitat due to the extensive use of herbicides. The US government has launched a $3.2 million project to restore the milkweed plant in the USA.

It is estimated that in the wild as few a 5% of all Monarch eggs survive to become adults whereas as many as 96% of all rescued eggs and caterpillars reach adulthood and are released into the wild. Thus at least for the next few years, until their natural habitat of milkweed can be restored, rescue and release will be an important part of the Monarch's survival as a species.

IMPORTANCE OF RECORDKEEPING

Keeping track of your experiences with Monarchs and sharing this information with others will help to further the efforts to restore the Monarchs to a safe number. This year Loving Garland Green may order a Monarch Watch Tagging Kit from Monarch Watch. Org. These kits come with the tags and instructions and are sold for $15 each. Our board is currently making this determination. We first need to understand the process better. The kits are sent out the first of August, near the beginning of the migration of the Monarchs. The primary purpose as I understand is to map the migration routes. I would be more interested in learning about the survival of fourth generation Monarchs. For example, if we tag and release Monarchs next fall, it would be fun to see that some of them made it back the next year to deposit eggs here in Texas for the first generation of the new year.

PLANTING MILKWEED MAY BE ALL THAT IS NEEDED FOR SOME.

It often is not necessary for residents to plant an entirely new flower garden. Many folks already have more than enough flowers (nectar plants) whether native or not to attract butterflies and other pollinators. All that is needed is to add some milkweed. Here in north Texas, you can obtain milkweed plants and seeds from various sources. A list of milkweed resources follows in the Appendix.

STRAW BALE/HUGELKULTUR MONARCH GARDEN

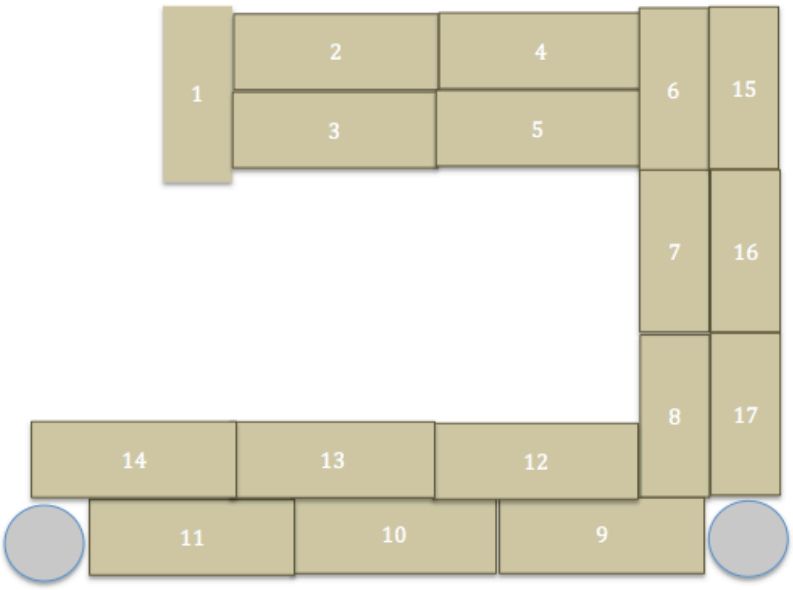
Garden Design by Elizabeth Berry – Loving Garland Green

The diagram below shows the proposed configuration of the straw bales. The bales are approximately 18 inches wide, 3 feet long and 2 feet high. The beds will be about four feet wide and the plants easily accessible from at least two sides.

By the end of the first year we anticipate the straw will have largely decomposed into rich organic matter. Garden soil and compost will be added around the plants at that time. In the meantime, the rich underlying matter in the hugelkultur will also be ready to supply moisture and nutrients ongoing to the plants. This design with the rotting logs and other organic matter emulates what happens on the forest floor. Also the compactness of this garden provides the intimate, protective setting that Monarchs like.

The two circles shown below could be spaces for warming rocks, puddling pools or a large container with more plants.

You can experiment with the design by adding more bales or by using fewer bales.



APPENDIX
MILKWEED RESOURCES

If you are looking for some milkweed plant or seeds, the following resources may help you to find them.

TEXAS SPECIFIC SOURCES

1) Texas Discovery Gardens Butterfly House – Fair Park – Dallas Texas

Butterfly Plant Sale
Member's Preview Sale: April 8, 2016 from 4 pm – 7 pm
Public Sale: April 9 and 10, 2016 from 10 am - 2 pm
Rare native pollinator-friendly plants are our specialty. Many are hard to find in local nurseries! Our Members' Plant Sale allows you to shop before the Saturday rush! Members also receive 10% off plants.

2) Loving Garland Green

In the fall of 2016 we hope to have lots of milkweed to share with the public.

3) Texas Parks and Wildlife Department
Tpwd.texas.gov

4) Native American Seed, TX

(800) 728-4043
info@seedsource.com
http://www.seedsource.com/

Available Species:
Butterfly Milkweed (*Asclepias tuberosa*)
Antelope Horns (*Asclepias asperula ssp. capricornu*)
Green Antelopehorn (*Asclepias viridis*)
Swamp Milkweed (*Asclepias incarnata*)
Common Milkweed (*Asclepias syriaca*)
Showy Milkweed (*Asclepias speciosa*)

5) Garden4Butterflies, TX

(972) 658-2918
garden4butterflies@outlook.com
http://www.garden4butterflies.com/

Available Species:
Green Antelopehorn (*Asclepias viridis*)
Antelope Horns (*Asclepias asperula ssp. capricornu*)
Butterfly Milkweed (*Asclepias tuberosa*)
Swamp Milkweed (*Asclepias incarnata*)

GENERAL RESOURCES FOR MILKWEED

MonarchWatch.org Milkweed Market

Go directly to their new Milkweed Request Form or continue reading for additional information. Looking for free milkweeds for large-scale restoration projects instead? Complete details are available here.

Their milkweed plugs come in **unmixed** flats of 32 plants. The plugs cost $66/flat, shipping included. Shipping is via UPS ground. They accept check or money order only, payable to Monarch Watch. Purchase orders are accepted in most cases. Your check WILL NOT be deposited until they know your plants can be shipped.

The Xerces Society has launched a **Milkweed Seed Finder** database to make locating seeds in your state easier. Search for seeds in your state and contact the native plant nurseries that are listed to order milkweed seeds or plugs, then get planting!

Monarch Joint Venture - http://monarchjointventure.org

The Monarch Joint Venture (MJV) is a partnership of federal and state agencies, non-governmental organizations, and academic programs that are working together to support and coordinate efforts to protect the monarch migration across the lower 48 United States.

National Wildlife Federation

Planting the Right Milkweed in your Region

- **Milkweed Native to Eastern U.S.**
- **Milkweed Native to the Great Plains**
- **Milkweed Native to Southeastern U.S.**

Milkweed seedling plugs

- **Monarch Watch Milkweed Market**

Milkweed Seeds for Home, Schools and Community Groups

- **Botanical Interests Seed packets**