Time to Restore: Louisiana

SUPPORTING POLLINATOR RESTORATION

When restoring land to support pollinators, managers aim to select a mix of species that support pollinators throughout their periods of activity. This guide provides information on the timing of flowering and fruiting of nectar plants in Louisiana and information on which species are most suitable for future climate conditions.

SHIFTS IN PHENOLOGY OF NECTAR PLANTS

Multiple factors can influence the timing of flowering, including warmth, freeze events, winter chill, rainfall, and daylength. Generally, researchers have documented earlier flowering in many flowering plants (United Nations Environment Programme, Frontiers 2022).

RESTORATION IN ACTION IN LOUISIANA

Several organizations and community groups are involved in pollinator restoration in Louisiana. New Orleans City Park Conservancy has established a phenology trail and is engaging volunteers, including Master Naturalists, in collecting data on flowering and seed timing of nectar plants.

Native Plant Initiative of Greater New Orleans strives to increase the use of native plants in the area by expanding public awareness of their ecological benefits, boosting availability, and by preserving and creating native plant communities.

Lafayette's Moncus Park has transformed a former agricultural education facility into a thriving native landscape with a phenology trail that includes nectar plants.

While little phenology research has been carried out in the region, authors of studies in other locations have reported a large shift in the timing of events, such as common milkweed, *Asclepias syriaca*, in the Midwest and Northeast shifting seven days earlier with each °F warming (Howard 2018). Other research found a different pattern between spring and fall-flowering species in the Southeastern Coastal Plain, with spring species flowering 4-3 days earlier per °F of warming. In the same study, fall flowering shifted slightly earlier with warmer spring temperatures and later with warmer summer temperatures at a rate of two days per °F (Pearson 2019). Under experimental warming, flowering of prairie plants occurred 2-10 days earlier (Wittington et al 2015).

FUTURE CLIMATE IN LOUISIANA

The following are projections for the South Central region for mid-century (2036-2065; Dixon et al 2020); ranges represent the low (Representative Concentration Pathway 2.6) and high (RCP 8.5) emissions scenarios.

- Average high temps increase 2.6-5.2°F
- Average low temps increase 2.2-4.6°F
- Increase of 10.5-24.3 very hot days over 100 °F
- Increase of 2.1-4 heatwaves a year
- Decrease of 13-26.1 days below freezing
- Increase of 5% in total annual rainfall in Southeast Louisiana
- Increase in the amount of 1 day (0.1 in) and 5 day (0.4-1.7 in) rainfall, particularly in Southern Louisiana

More climate projections from the SC CASC can be found at: southcentralclimate.org/resources/climate-projections.

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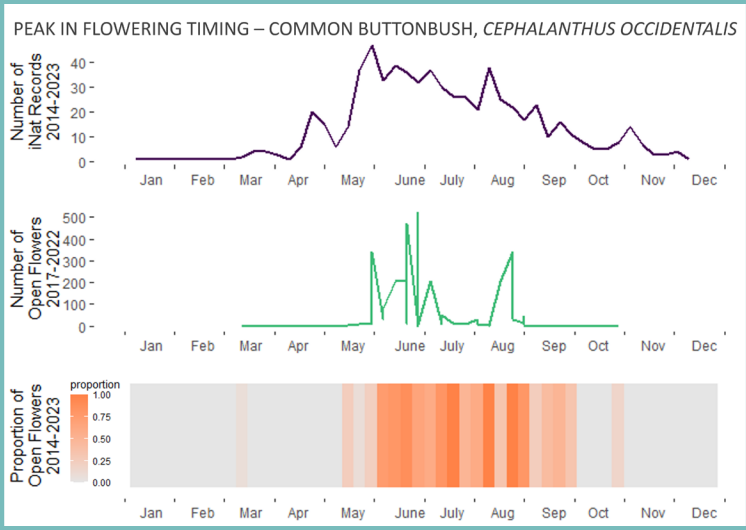
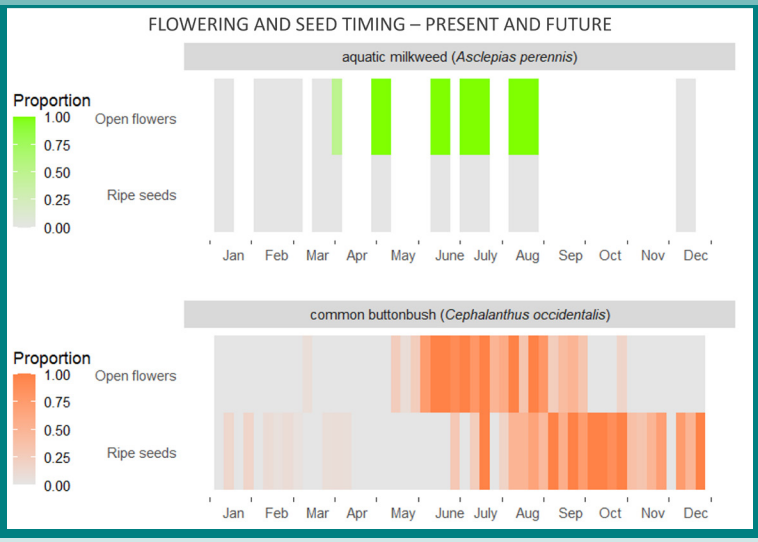


We compiled data collected via iNatualist and *Nature's Notebook* on flowering and seed timing in Time to Restore priority species. The graph at left shows the timing of open flowers as well as the peak in activity in common buttonbush, *Cephalanthus occidentalis*, in Louisiana.

Top: Presence records contributed to iNaturalist, which show the magnitude of observations collected on this species across 2014-2023. Middle: Number of open flowers observed in *Nature's Notebook* 2017-2022. Bottom: Proportion of open flowers in *Nature's Notebook* 2014-2023.

We also created linear models to determine climate cues to flowering and seed timing, presented below. Visit the StoryMap linked from the Time to Restore webpage (usanpn.org/TimeToRestore) to learn more about our methods.



Based on our national-scale analysis of climate cues combined with climate projections from the SC CASC, we project the following changes to life cycle stages by mid-Century (2036-2065):

We did not have sufficient data to identify climate cues for aquatic milkweed, *Asclepias perennis.*

Common buttonbush, *Cephalanthus occidentalis*
Open flowers onset - 5-10 days earlier
Flowering peak onset - 3-5 days earlier

Projections for species not included in community calendar above		
Species	**Life Cycle Stage**	**Projected shift**
wild bergamot, *Monarda fistulosa*	Open Flowers Onset	0.1-1 days later
	Flowering Peak Duration	0.02-3 days shorter
	Ripe Fruit Onset	3-5 days earlier
	Fruit Peak Onset	1-10 days later
	Fruit Peak Duration	0.1-1 days longer
eastern purple coneflower, *Echinacea purpurea*	Open Flowers Onset	7-14 days earlier
	Flowering Peak Onset	6-11 days earlier
	Ripe Fruit Onset	2-10 days earlier
	Fruit Peak Onset	7-13 days earlier
	Fruit Peak Duration	9-17 days longer
common sunflower, *Helianthus annuus*	Open Flowers Onset	9-19 days earlier
	Flowering Peak Onset	10-20 days earlier (latitude)
swamp milkweed, *Asclepias incarnata*	Open Flowers Onset	7-14 days earlier
	Flowering Peak Duration	4-8 days longer
	Ripe Fruit Onset	0.5-1 days later
	Fruit Peak Onset	4-8 days earlier
silver maple, *Acer saccharinum*	Open Flowers Onset	5-15 days earlier (latitude)
	Flowering Peak Onset	8-13 days earlier
	Ripe Fruit Onset	7-13 days earlier
	Fruit Peak Onset	3-5 days earlier
cardinal flower, *Lobelia cardinalis*	Open Flowers Onset	10-19 days later
	Flowering Peak Onset	0.11-1.14 days earlier
	Flowering Peak Duration	10-18 days longer

References:

Dixon K.W., A.M. Wootten, M.J. Nath, J. Lanzante, D.J. Adams-Smith, C.E. Whitlock, C.F. Gaitán, R.A. McPherson, 2020: South Central Climate Projections Evaluation Project (C-PrEP), South Central Climate Adaptation Science Center, Norman, Oklahoma, USA. doi.org/10.21429/12gk-dh47

Howard, A.F. 2018. Asclepias Syriaca (Common Milkweed) flowering date shift in response to climate change. Sci Rep 8,17802. doi.org/10.1038/s41598-018-36152-2

Pearson, K.D. 2019. Spring- and fall-flowering species show diverging phenological responses to climate in the Southeast USA. Int J Biometeorol 63, 481–492. doi.org/10.1007/s00484-019-01679-0

Whittington, H. R., D. Tilman, P. D. Wragg, and J. S. Powers. 2015. Phenological responses of prairie plants vary among species and year in a three-year experimental warming study. Ecosphere 6(10):208. dx.doi.org/10.1890/ES15-00070.1

United Nations Environment Programme 2022. Frontiers 2022: Noise, Blazes and Mismatches – Emerging Issues of Environmental Concern. Nairobi.

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