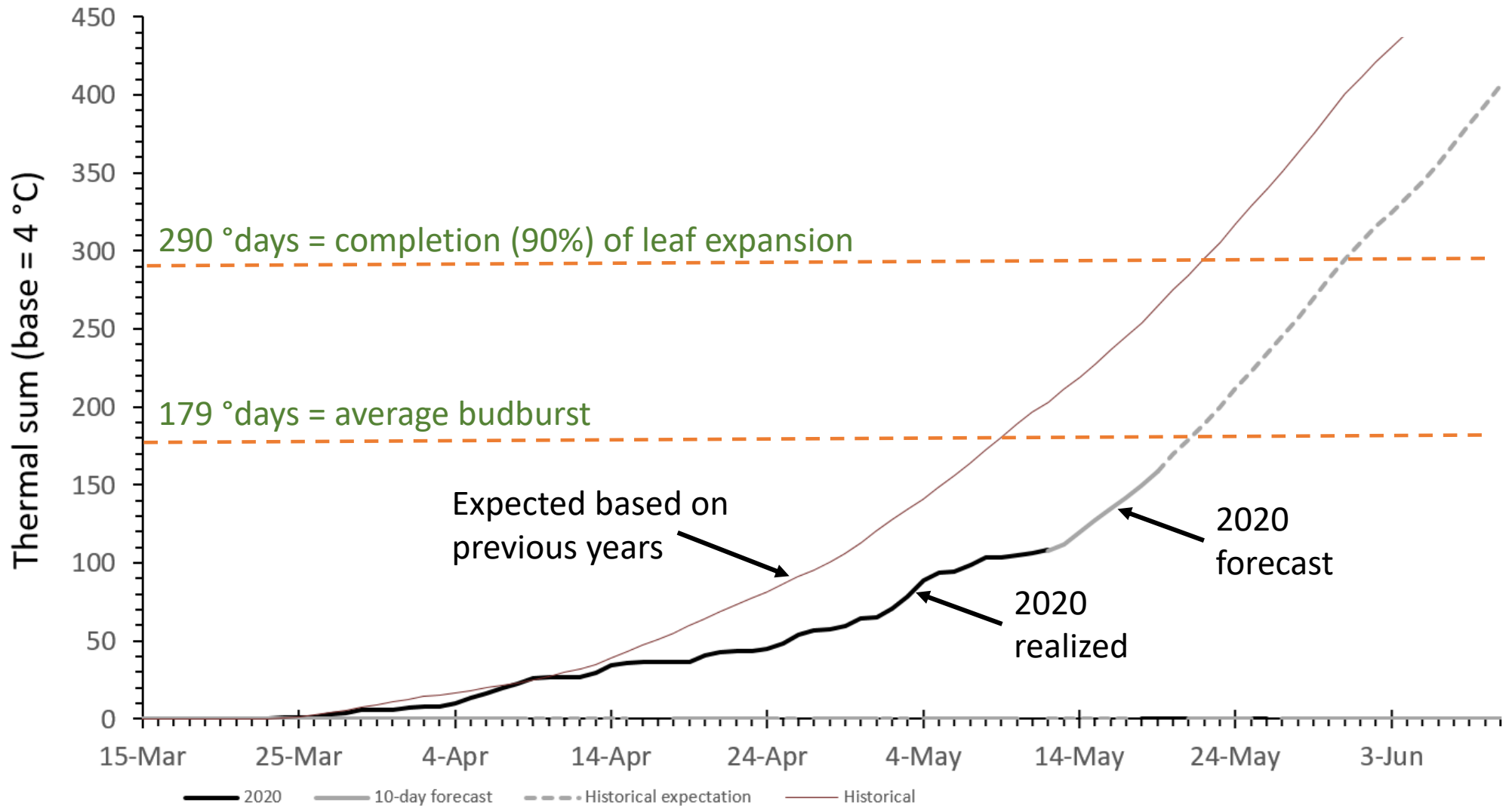


As of 12 May 2020:

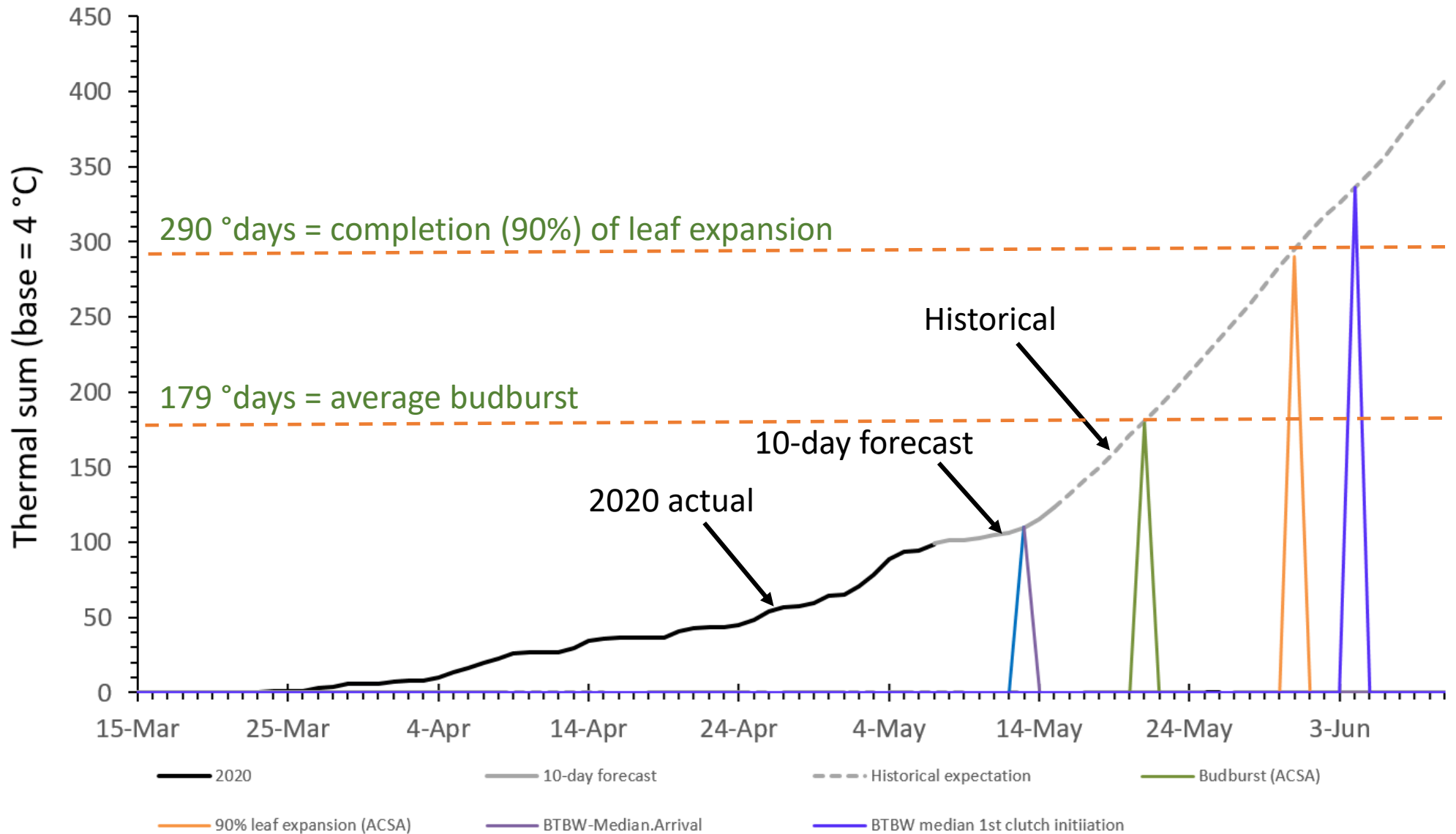
Realized and forecast temperatures for the year compared to expected temperatures based on previous years



Estimated leaf-out phenology for Main Bird Plot 2020 based on thermal sums.

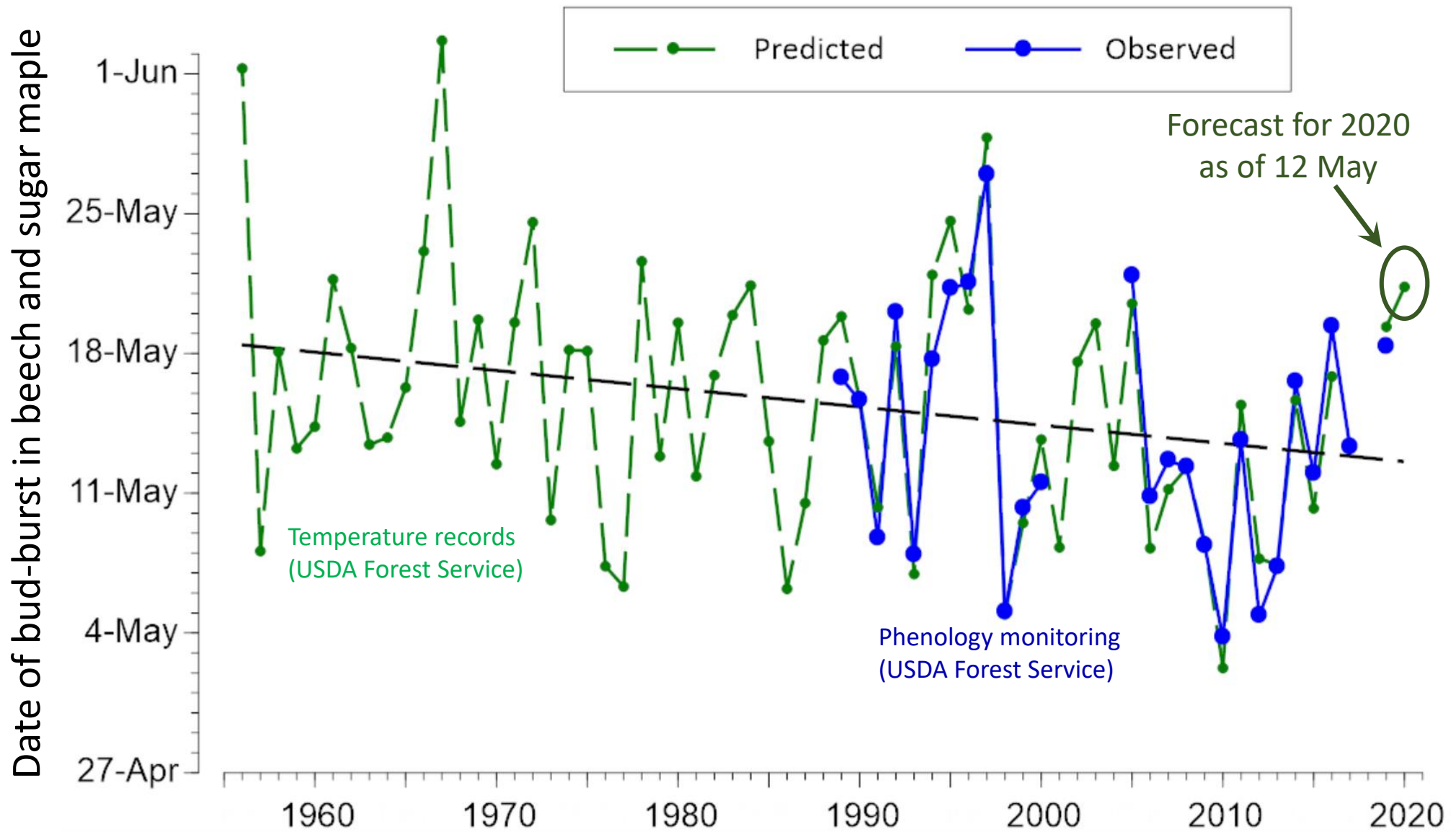
As of 12 May 2020, predicted dates for budburst and 90% completion of leaf expansion are:  
21 May and 31 May.

Predicted median dates of Arrival and 1<sup>st</sup> clutch initiation by Black-throated Blue Warblers are:  
13 May and 4 June.



Real-time temperature records from USDA National Water & Climate Center (site 2069).

Phenological models adapted from Lany et al. 2016 using long term data of USDA Forest Service.



As of 12 May 2020, predicted dates for budburst and 90% completion of leaf expansion are:  
21 May and 31 May.

Predicted median dates of Arrival and 1<sup>st</sup> clutch initiation by Black-throated Blue Warblers are:  
13 May and 4 June.

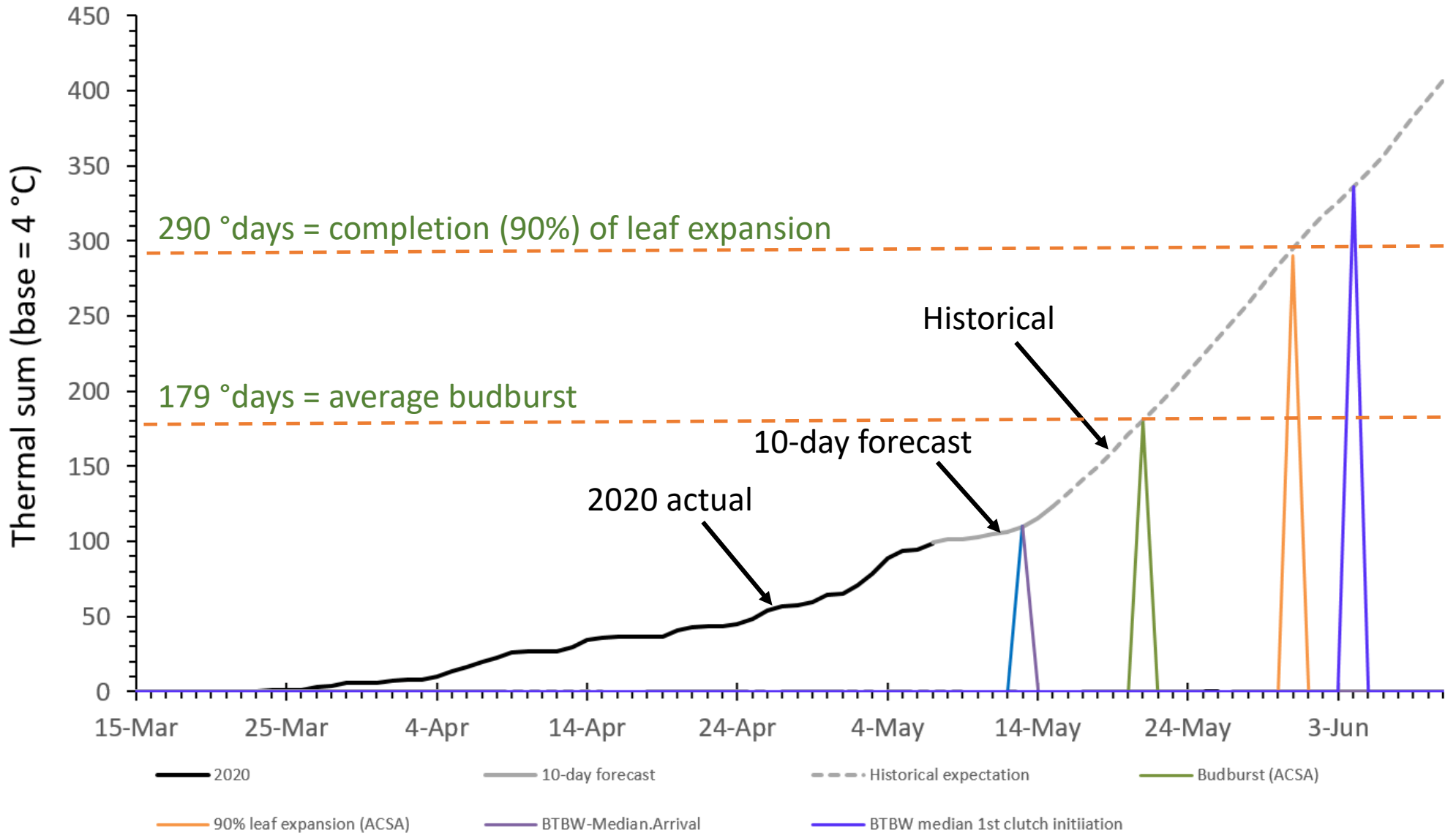
Estimated leaf-out phenology for Main Bird Plot 2020 based on thermal sums.

As of 7 May 2020, predicted dates for budburst and 90% completion of leaf expansion are:

21 May and 31 May.

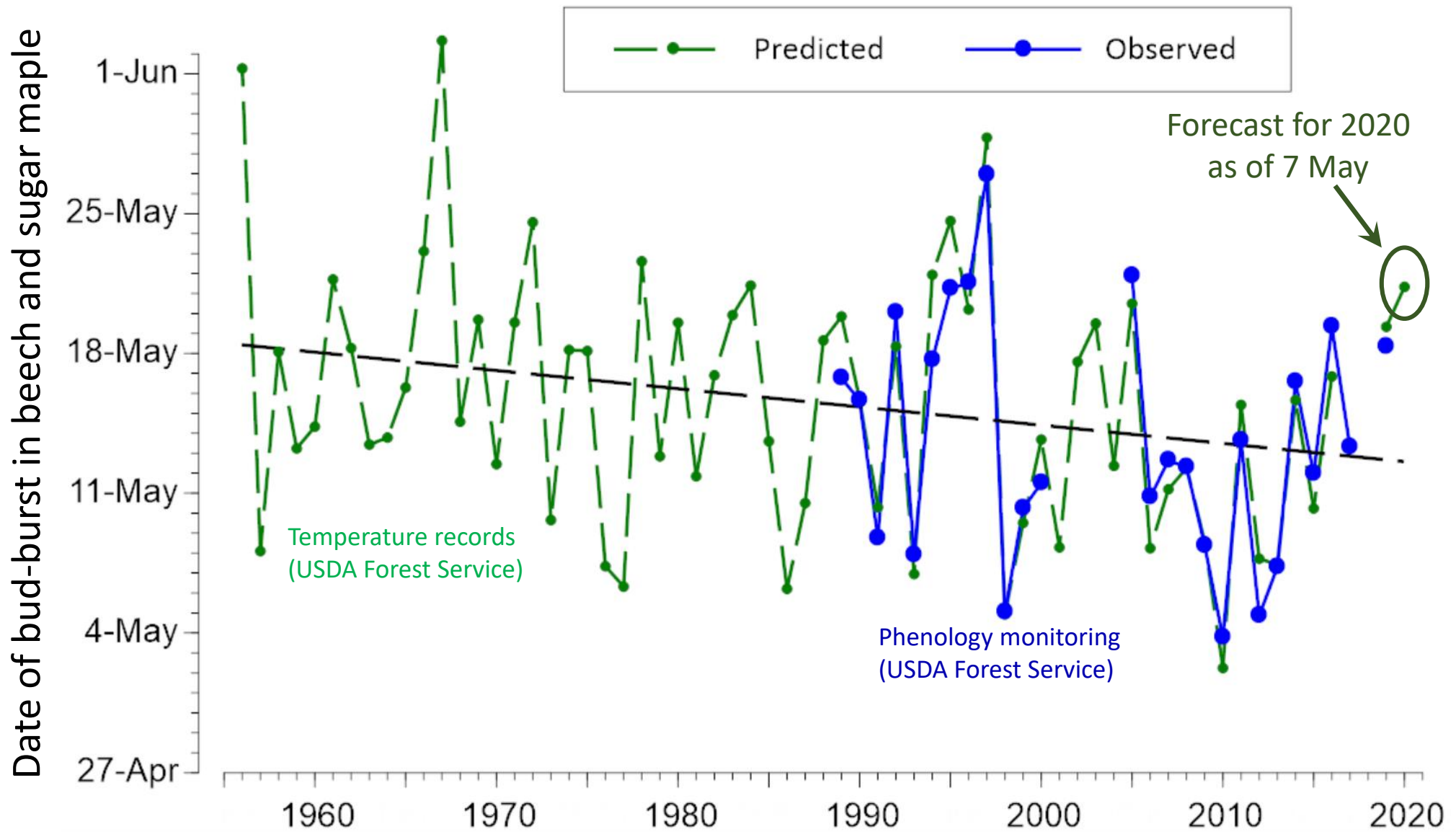
Predicted median dates of Arrival and 1<sup>st</sup> clutch initiation by Black-throated Blue Warblers are:

13 May and 4 June.



Real-time temperature records from USDA National Water & Climate Center (site 2069).

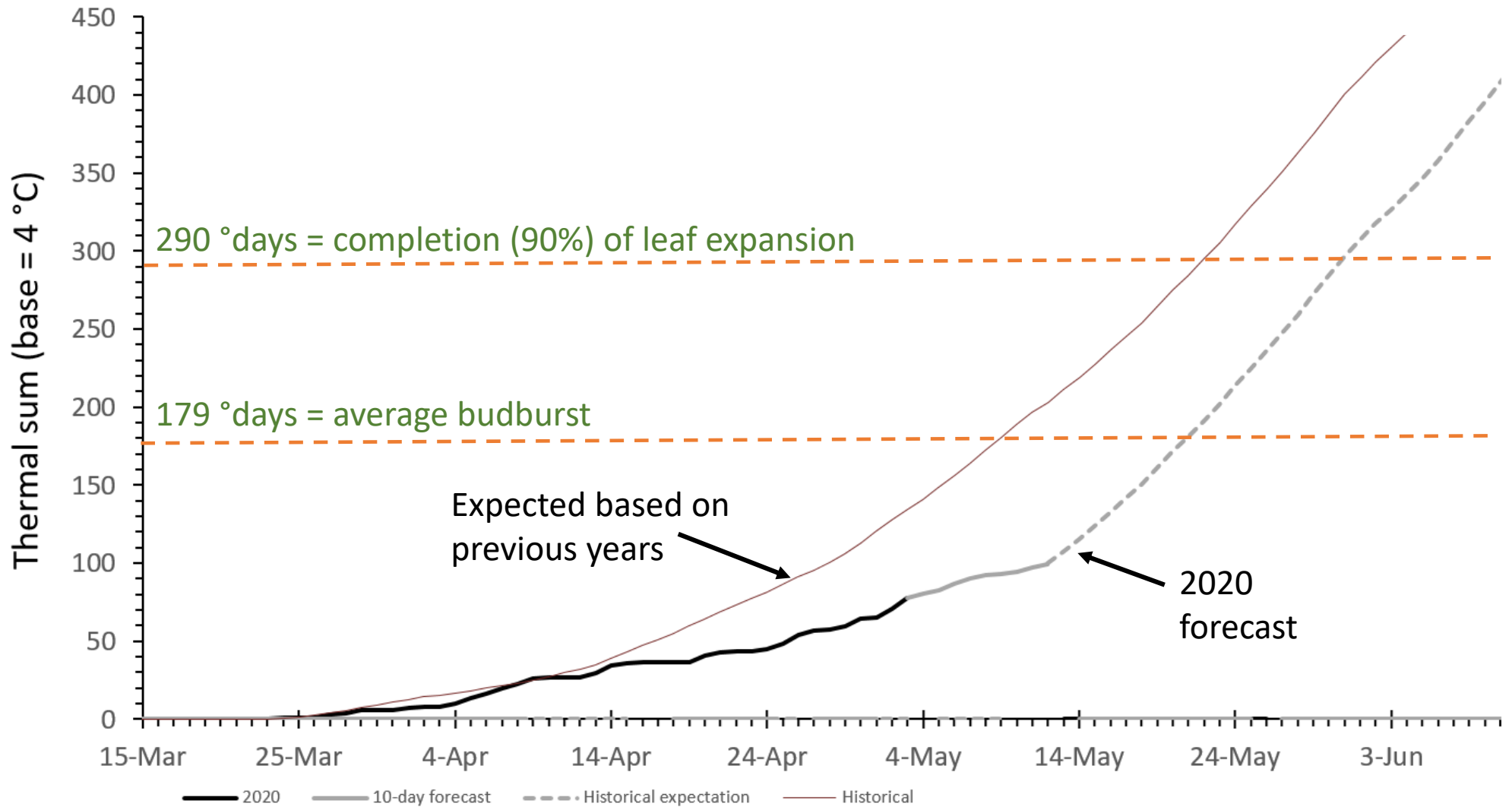
Phenological models adapted from Lany et al. 2016 using long term data of USDA Forest Service.



As of 7 May 2020, predicted dates for budburst and 90% completion of leaf expansion are:  
21 May and 31 May.

Predicted median dates of Arrival and 1<sup>st</sup> clutch initiation by Black-throated Blue Warblers are:  
13 May and 4 June.

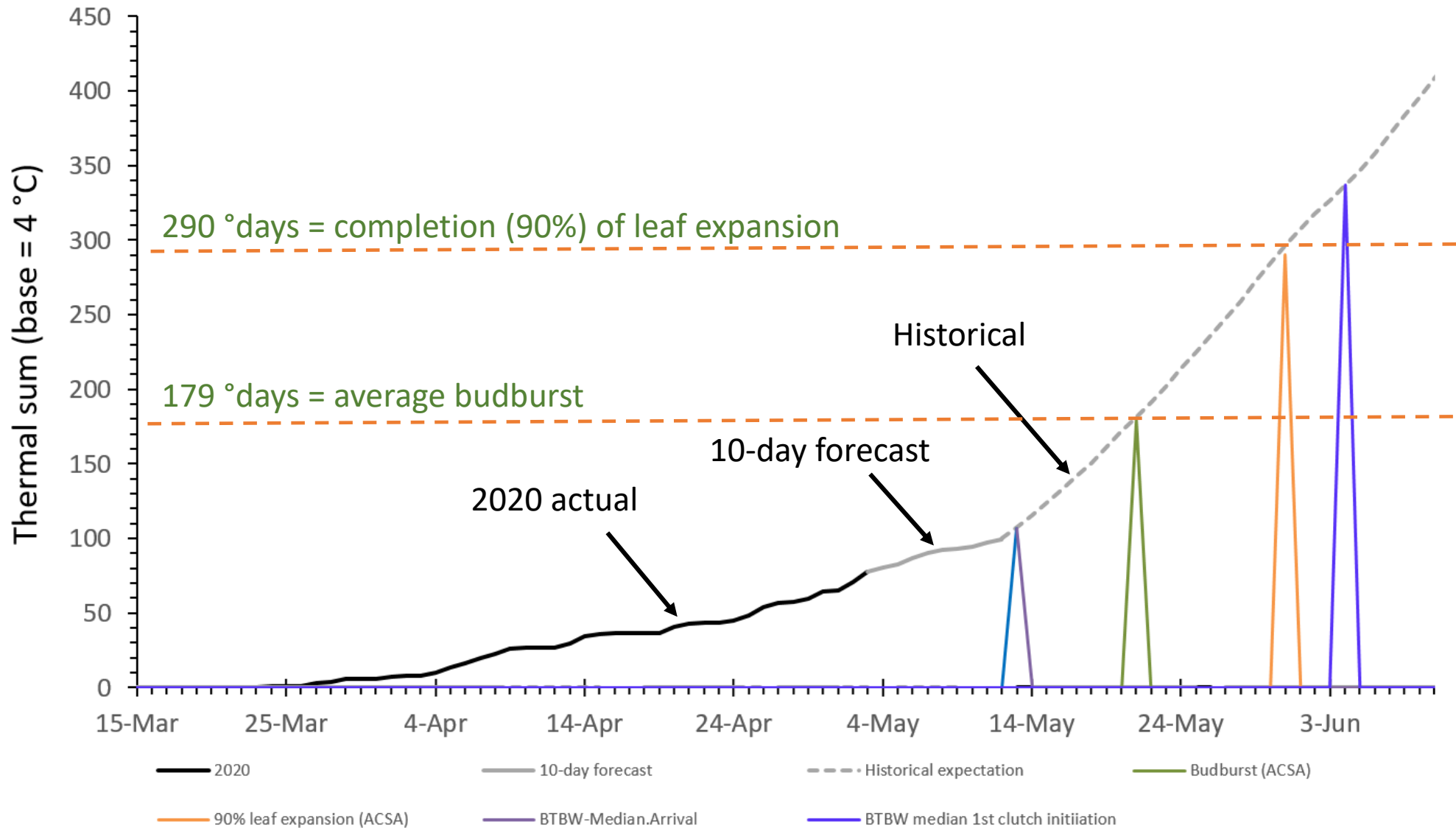
As of 3 May 2020,  
Realized and forecast temperatures compared to expected temperatures based on previous years



Estimated leaf-out phenology for Main Bird Plot 2020 based on thermal sums.

As of 5 May 2020, predicted dates for budburst and 90% completion of leaf expansion are:  
21 May and 31 May.

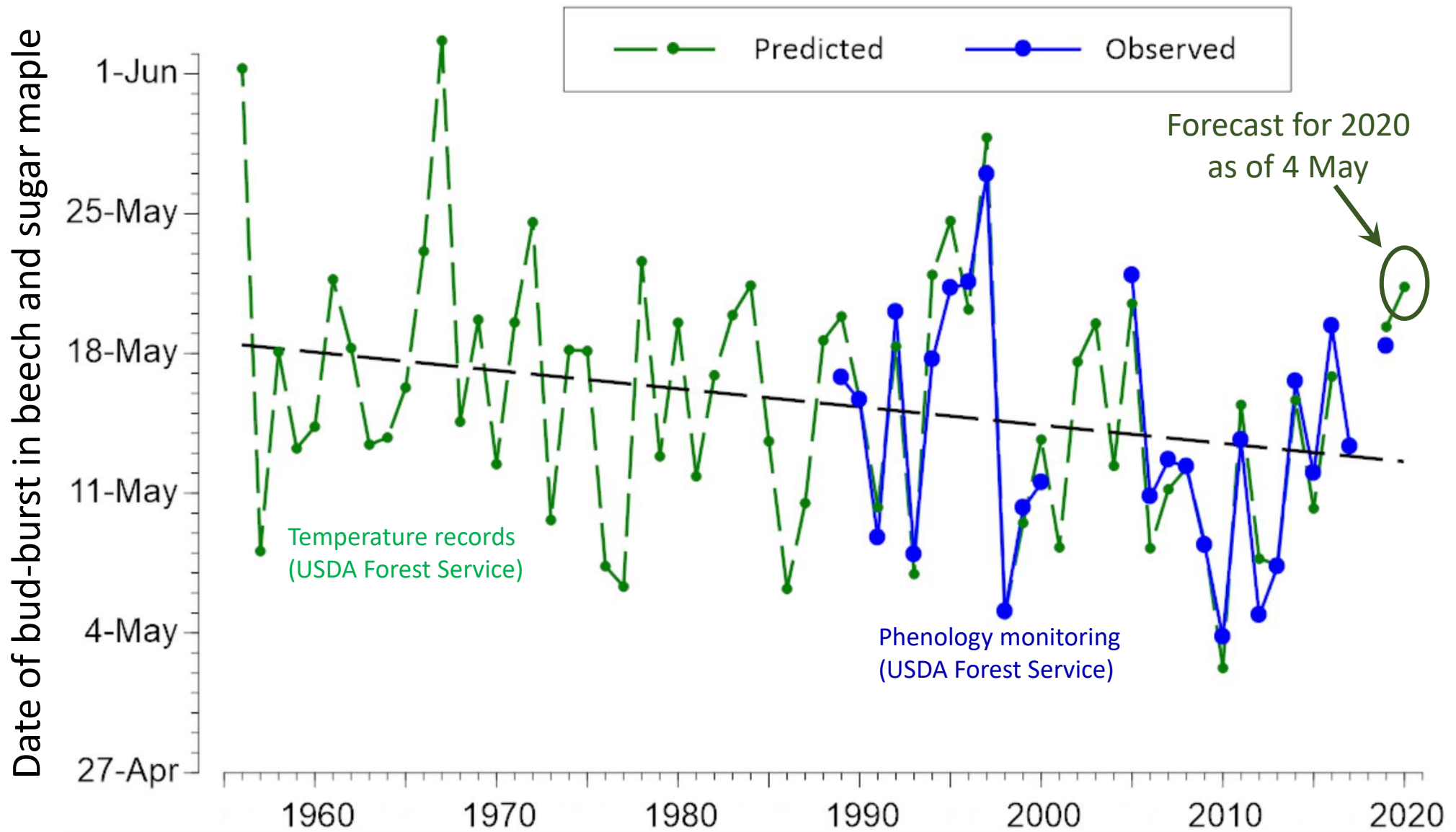
Predicted median dates of Arrival and 1<sup>st</sup> clutch initiation by BTBW are:  
13 May and 4 June.



Real-time temperature records from USDA National Water & Climate Center (site 2069).

Phenological models adapted from Lany et al. 2016 using long term data of USDA Forest Service.





As of 5 May 2020, predicted dates for budburst and 90% completion of leaf expansion are:  
21 May and 31 May.

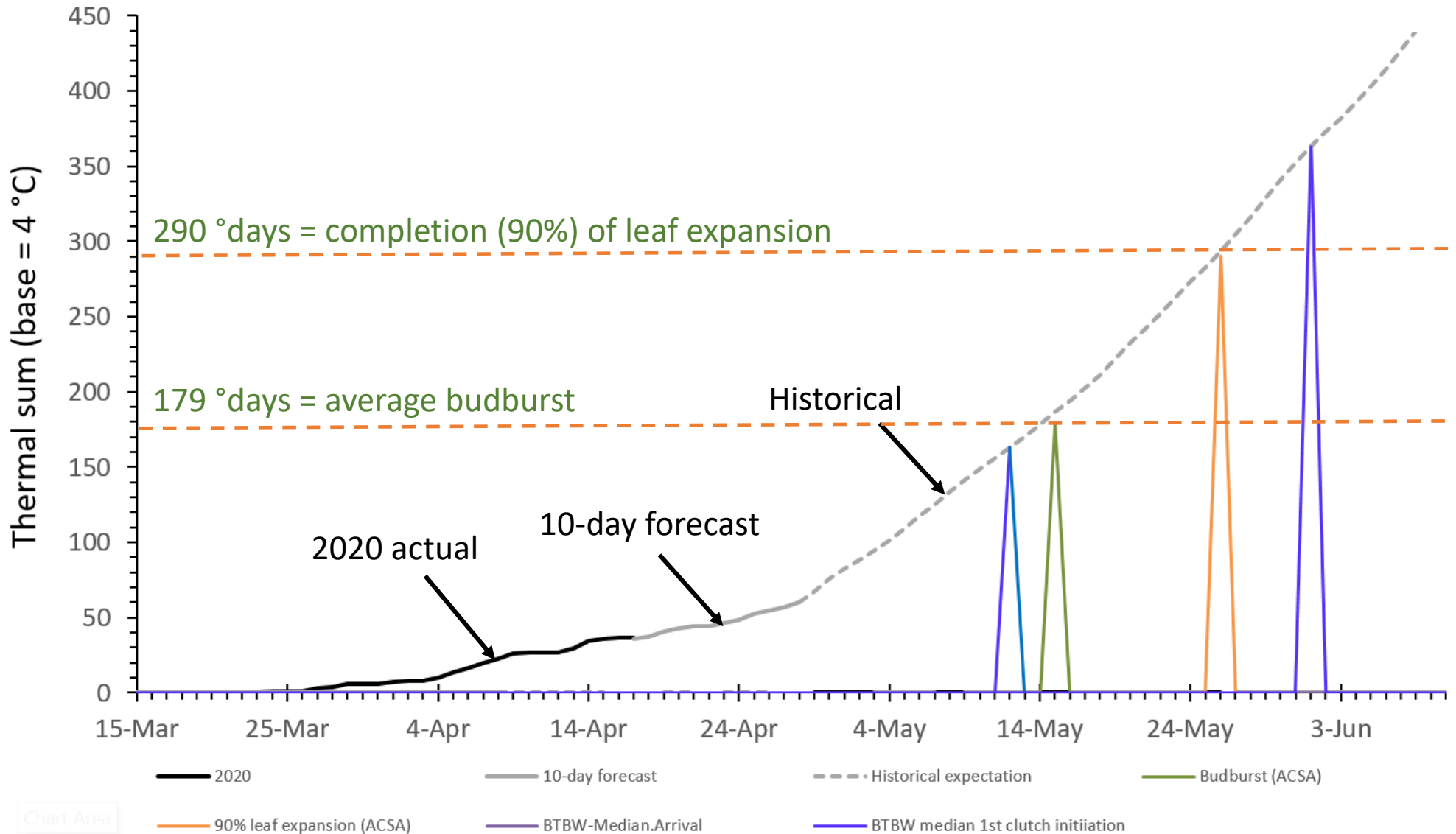
Predicted median dates of Arrival and 1<sup>st</sup> clutch initiation by Black-throated Blue Warblers are:  
13 May and 4 June.



Estimated leaf-out phenology for Main Bird Plot 2020 based on thermal sums.

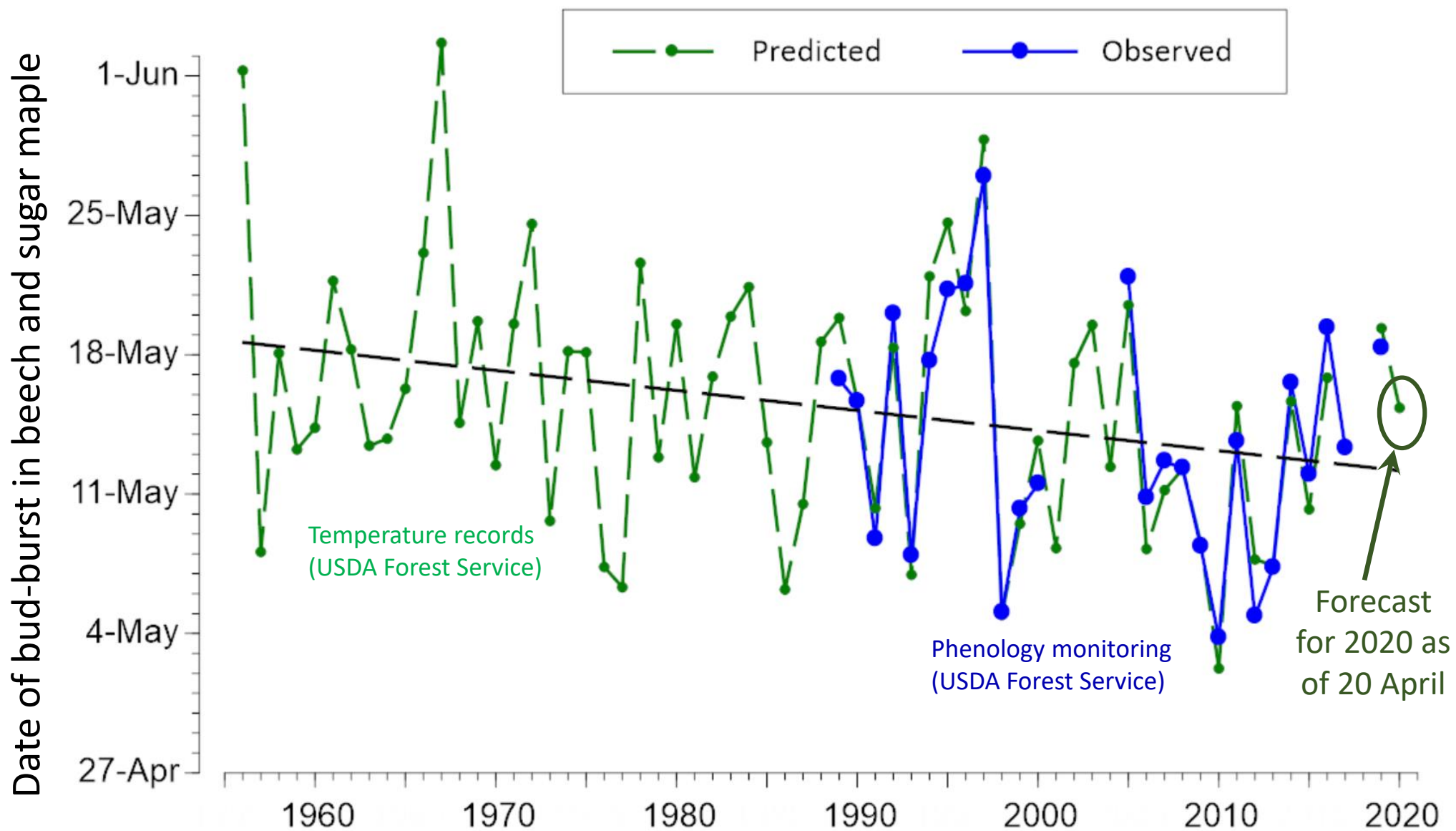
As of 20 April 2020, predicted dates for budburst and 90% completion of leaf expansion are:  
15 May and 26 May.

Predicted median dates of Arrival and 1<sup>st</sup> clutch initiation by BTBW are:  
12 May and 1 June.



Real-time temperature records from USDA National Water & Climate Center (site 2069).

Phenological models adapted from Lany et al. 2016 using long term data of USDA Forest Service.



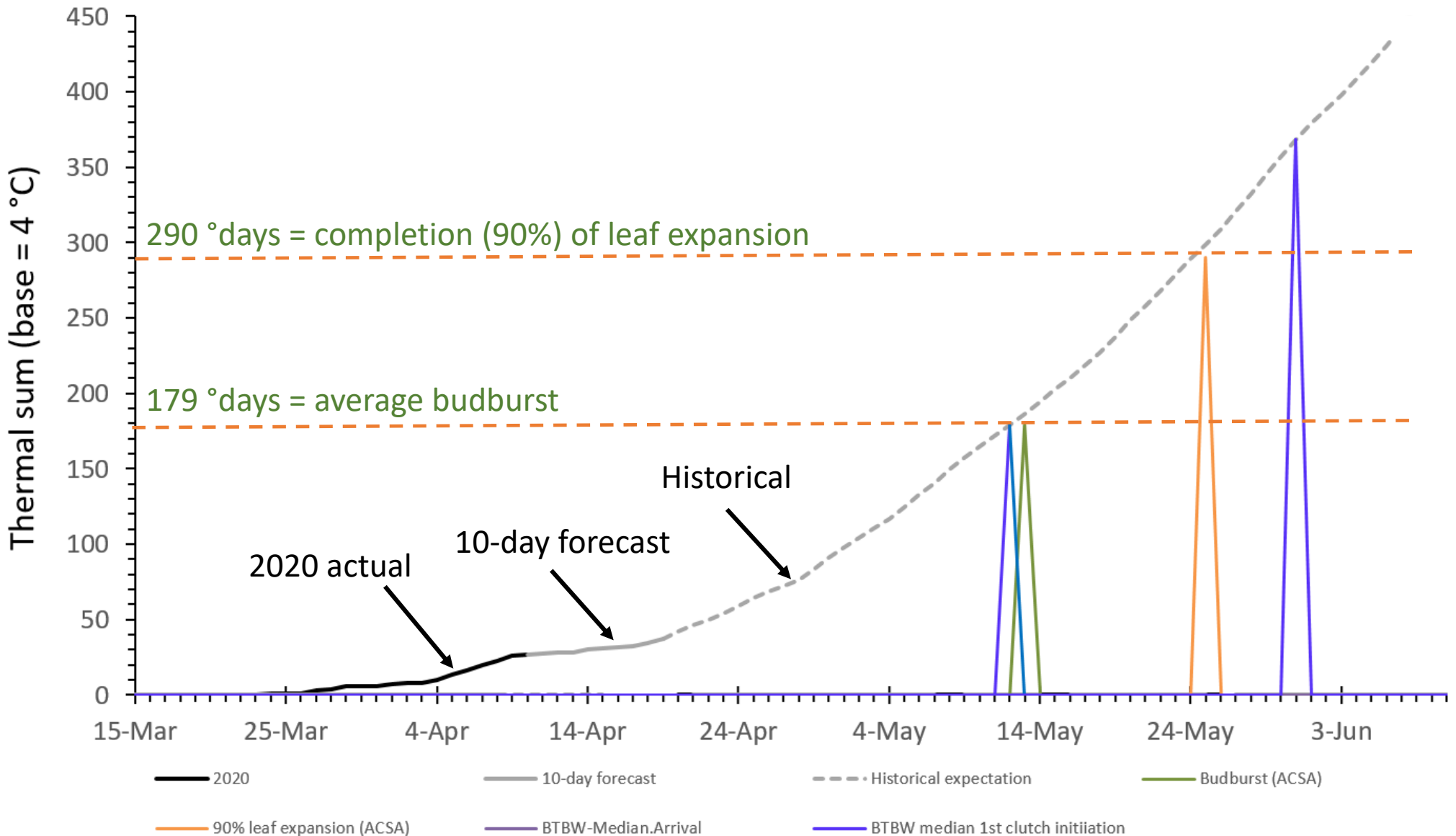
As of 20 April 2020, predicted dates for budburst and 90% completion of leaf expansion are:  
15 May and 26 May.

Predicted median dates of Arrival and 1<sup>st</sup> clutch initiation by Black-throated Blue Warblers are:  
12 May and 1 June.

Estimated leaf-out phenology for Main Bird Plot 2020 based on thermal sums.

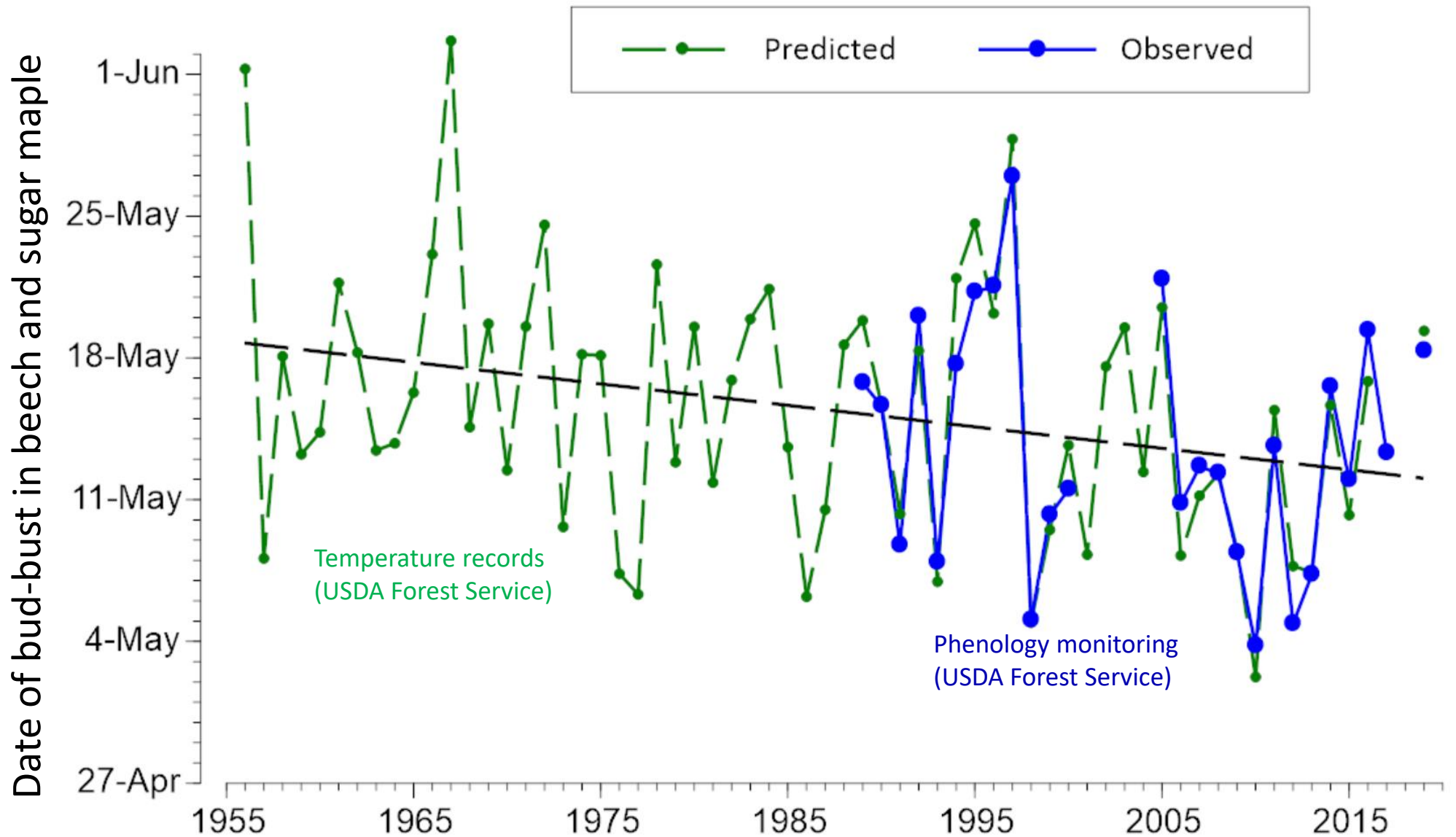
As of 11 April 2020, predicted dates for budburst and 90% completion of leaf expansion are:  
13 May and 25 May.

Predicted median dates of Arrival and 1<sup>st</sup> clutch initiation by BTBW are:  
12 May and 31 May.



Real-time temperature records from USDA National Water & Climate Center (site 2069).

Phenological models adapted from Lany et al. 2016 using long term data of USDA Forest Service.



- Budburst defines the beginning of annual activity in the green food web.
- The date of budburst in sugar maple and beech varies by up to four weeks among years (4 May to 2 June since 1957).
- The expected date has advanced by 7 days in 60 years.
- Best prediction model as of 2019: budburst at  $179^\circ \text{days} > 4^\circ \text{C}$  after 21 March (modified from Lany et al. 2016).