

NWS FORM E-5

U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:

North Webster, IN

REPORT FOR (MONTH & YEAR):

January 2002

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:

February 10th, 2002

TO: NATIONAL WEATHER SERVICE (W/OH12X1)
HYDROMETEOROLOGICAL INFO CENTER
1325 EAST-WEST HIGHWAY, RM 7116
SILVER SPRING, MD 20910

SIGNATURE:

Michael Sabones, MIC

Greg Lamberty, Service Hydrologist

When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (WSOM E-41).

An X inside this box indicates that no flooding occurred within this Hydrologic Service Area.



General Overview: January, 2002 across Northern Indiana, Northwest Ohio and Extreme Southern Michigan was wetter and much warmer than normal. Precipitation totals averaged about a third of an inch above normal. Temperatures averaged nearly 10 °F above normal. The weather started out cold in January, but by the 5th, temperatures were above normal and remained well above normal for the most part through the end of the month. The average high temperature was in the lower 40s, the average low temperature was in the middle 20s giving an average temperature in the lower 30s. Only 1.5 inches of snow fell at Fort Wayne and 10.4 inches of snow fell at South Bend in January 2002. (Only NWS Fort Wayne and South Bend data were used)

January was very dry for the first 28 days with precipitation amounting to just around 0.3 inches (COOP Data). A major snow/sleet/freezing rain/rain storm moved into the area late on the 29th and lasted into the morning of the 1st of February. Much of the precipitation was rain and freezing rain with snow confined to Northwest Indiana and Southern Michigan. Much of the freezing/frozen precipitation fell on the 30th and 31st, and melted on the night of the 31st as a surge of warm air invaded the region. Precipitation averaged around 2.6 inches through the morning of the 1st of February (COOP Data). The unusually heavy precipitation over the last 3 days of January resulted in flooding of rivers in Northern Indiana and Northwest Ohio.

Flood warnings were issued for the Maumee, St. Marys, Blanchard, St. Joseph (Ohio), Tippecanoe, Tiffin, Eel and Wabash Rivers on the 30th and 31st.

The Palmer Drought Severity Index for the period ending February 2nd reflected the heavy rains/snows of the last 3 days. Unusually moist to extremely moist soil conditions prevailed across Northern Indiana, Northwest Ohio and Southern Michigan. Palmer Indices ranged from +2.71 (Unusually Moist) for Southwest Michigan to +4.07 (Extremely Moist) for Southeast Michigan. North Central (+3.68) and Northeast Indiana (+3.69) as well as South Central (+3.14) Michigan and Northwest Ohio(+3.25) had very moist soils. Northwest Indiana (+2.83) had unusually moist soils.

Temperature: For Fort Wayne, the average high temperature in January, 2002 was 41.9 °F the average low was 26.1 °F. This gave an average temperature of 34.0 °F which was 10.4 °F above normal. At South Bend, the average high temperature was 39.2 °F and the average low was 26.1 °F giving an average temperature of 32.6 °F which was 9.2 °F above normal for January. The record highs for January 27th and 28th were broken at South Bend when the mercury reached 59 °F and 58 °F respectively. No record high temperatures were recorded at Fort Wayne in January 2002. January 2002 was the 3rd warmest January on record at South Bend and the 4th warmest on record at Fort Wayne.

Precipitation: Precipitation was above normal at both Fort Wayne and South Bend in January, 2002. At Fort Wayne 2.56 inches of precipitation fell, 0.51 inches above normal for January. At South Bend 2.48 inches of precipitation fell, 0.21 inches above normal for January. 10.4 inches of snow fell at South Bend, normal is 22.8 inches. Only 1.5 inches of snow fell at Fort Wayne in January, 2002, normal is 8.3 inches. Most of the precipitation fell as rain across the area with the exception of Northern Indiana and Southern Michigan where a snow and freezing rain mix dominated.

Weather: The weather in January, 2002 was quiet for the most part until the 29th with modified Maritime Polar air masses dominating the weather. No major storms entered the area until the 29th when a major system moved in from the West Coast.

The West Coast system developed several low pressure systems over the Southern Plains which swung northeast into the Great Lakes Region with a variety of precipitation. The precipitation began as rain on the evening of the 29th across the entire area as the first low passed across the area. A cold air mass slid over the area behind the first low pressure system.

A second low then moved in from the southwest late on the 30th. With cold air in place the precipitation was a mix across the area. Parts of Southern Michigan and Northwest Indiana received up to 5 inches of snow by the morning of the 31st. South of the snow area, a 60 mile wide band of freezing rain occurred south of a line from about 50 miles southwest of South Bend to Hillsdale Michigan. The precipitation over the snow areas eventually changed over to freezing rain as well. As a result of the large accumulation of ice, many areas lost power as the weight of the ice broke many tree limbs that downed many power lines. South of the freezing rain band the precipitation was all rain.

With the heavy rain, river flood warnings were issued for the Maumee, Saint Marys, Blanchard, Saint Joseph (Ohio), Tiffin, Tippecanoe, Eel and Wabash Rivers. The Wabash, Eel and the Tiffin went into flood on the 31st with the rest going into flood in early February.

The third low approached the area late on the 31st spreading rain across the entire region as a surge of warm air overspread the area ahead of the low. The warm air melted most of the snow and ice which resulted in rises on the Saint Joseph River (Michigan) and the Elkhart River. However the runoff was not enough for these rivers to go into flood. The

Kankakee River at Davis in Northwest Indiana did go into flood in early February.

The Wabash, Tiffin and Eel Rivers were in flood as January 2002 closed with others rising toward flood stage.

In January, 2002, 7 Flood Warnings (FLWs) and 3 Flood Statements (FLSs) were issued by WFO IWX to cover January river flooding. One Flood Statement was issued to cover urban and small creek flooding for 23 counties in Northern Indiana and Northwest Ohio.

Rivers were still rising as January ended.

NWS FORM E-5

U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH & YEAR):
February 2002

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
March 5th, 2002

TO: NATIONAL WEATHER SERVICE (W/OH12X1)
HYDROMETEOROLOGICAL INFO CENTER
1325 EAST-WEST HIGHWAY, RM 7116
SILVER SPRING, MD 20910

SIGNATURE:
Michael Sabones, MIC
Greg Lamberty, Service Hydrologist

When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (WSOM E-41).

An **X** inside this box indicates that no flooding occurred within this Hydrologic Service Area.

General Overview: February, 2002 across Northern Indiana, Northwest Ohio and Extreme Southern Michigan was much warmer than normal. This followed the pattern set in January, 2002. Precipitation totals average around normal for a February. Temperatures averaged over 6 °F above normal. The weather was warmer than normal for the first 25 days of the month with several periods of much warmer than normal temperatures. The most significant period of warm weather stretched from 6th through the 10th with temperatures averaging around 12 °F above normal. The 9th was the warmest day of the month with high temperatures averaging in the upper 50s.

The weather pattern shifted on the 25th bringing colder temperatures to the area. Temperatures averaged 9 °F below normal as February ended. The coldest day was the 28th as low temperatures fell into the single digits. No record high or low temperatures were recorded at either Fort Wayne or South Bend. The average high temperature was in the lower 40s, the average low temperature was in the middle 20s giving an average temperature in the lower 30s, the same as in January. 6 inches of snow fell at Fort Wayne and 18.4 inches of snow fell at South Bend in February 2002. (Only NWS Fort Wayne and South Bend data were used). Most of the snow fell in the last 3 days of the month.

Rivers were in flood as February began. The flooding was caused by a major rain/snow/freezing rain and sleet storm that plowed through the area during the last several days of January ending on the 1st of February. Rivers and streams were rising and 4 more flood warnings (FLWs), in addition to the 7 that were issued in January, were issued on February 1st and they were for Davis on the Kankakee, Marion on the Mississinewa, Montpelier on the St. Joseph (Ohio) and Fort Jennings on the Auglaize Rivers. Rivers that were in flood in February were: The Maumee, St. Marys, St. Joseph (Ohio), Auglaize, Tiffin, Kankakee, Eel, Blanchard, Tippecanoe, and the Wabash. 25 (FLSs) were issued to cover flooding in February. All of the rivers fell below flood stage by the 8th of February due to lack of any significant precipitation. No flooding occurred for the rest of the month.

February was quite dry for the first 18 days with total precipitation amounts less than a

quarter of an inch occurring (COOP Data). A major rain storm passed through the area on the 19th and 20th with precipitation averaging over 0.80 inches across the area (COOP Data). A Hydrologic Outlook was issued by WFO Indianapolis for our area on the 19th, they were backing us up that day, for potential flooding from the 20th through the 23rd. However, much of the forecast rainfall remained south of our area and as a result, all rivers and streams remained below flood stage.

The next precipitation event occurred on the 25th through the 27th and it was mostly snow. An Arctic cold front pushed through the area on the 25th dropping temperatures from the middle 50s to the lower 30s on the 26th. Nearly 6 inches fell at Fort Wayne and nearly 17 inches fell at South Bend. The snowfall at South Bend was a mix of storm and lake effect snowfall. The highest totals occurred over Northwest and North Central Indiana and Southwest Michigan. The NWS office in Northern Indiana reported over 11 inches with the storm. Another storm approached from the southwest as February closed. It promised to bring a mix of snow and rain to the region early March. The snow depth at the end of the month ranged from around 10 inches over parts of Northwest and North Central Indiana and Southwest Michigan to 3 to 4 inches across Northeast Indiana, South Central Michigan and Northwest Ohio. Snow water equivalent amounts were around one inch since much of the snow fell at a 10 to one snowfall to liquid water ratio.

The Palmer Drought Severity Index for the period ending February 23rd continued to show moist soil conditions prevailing across the area. Unusually moist to very moist soil conditions prevailed across the entire region. Palmer Indices ranged from +2.67 (Unusually Moist) for Northwest Ohio to +3.92 (Very Moist) for Southeast Michigan. North Central (+3.46) and Northeast Indiana (+3.18) as well as South Central (+3.03) Michigan had very moist soils. Northwest Indiana (+2.80) and Southwest Michigan (+2.84) had unusually moist soils.

Temperature: For Fort Wayne, the average high temperature in February, 2002 was 42.9 °F the average low was 24.9 °F. This gave an average temperature of 33.9 °F which was 6.6 °F above normal. At South Bend, the average high temperature was 40.7 °F and the average low was 25.2 °F giving an average temperature of 32.9 °F which was 5.6 °F above normal for February. February 2002 was the 8th warmest and 16th snowiest February on record at South Bend and the 10th warmest on record at Fort Wayne.

Precipitation: Precipitation averaged around normal at Fort Wayne and South Bend in February, 2002. At Fort Wayne 1.80 inches of precipitation fell, 0.14 inches below normal for February. At South Bend 2.10 inches of precipitation fell, 0.12 inches above normal for February. 18.4 inches of snow fell at South Bend, normal is 16.0 inches. 6.0 inches of snow fell at Fort Wayne in February, 2002, normal is 8.3 inches. About half of the precipitation fell as snow across the area, with most of the snowfall occurring during the last 3 days of the month.

Weather: There were 2 significant precipitation events in February, 2002. The first occurred on the 19th and the 20th. Temperatures were well above normal across the area from the 6th through the 18th and warmed even more on the 19th and 20th. A storm system

formed over the southern plains on the 18th and spread a lot of rain into the area. Forecasts were for about 1 to 2 inches on the 19th and 20th of the month. This prompted the issuance of an Hydrologic Outlook (ESF) on Tuesday the 19th for Northern Indiana, Southern Michigan and Northwest Ohio for the potential of flooding from Wednesday afternoon, the 20th through Saturday the 23rd. However precipitation totals were held down by thunderstorms that formed over the Gulf Coast States reaching only 0.83 inches (COOP Data). The thunderstorms prevented much of the moisture flow into our area. Thus the threat of flooding was diminished. Rivers were in flood as February began and crested early in the month. With the lack of any significant precipitation through the 18th, all rivers fell below flood stage by the 8th. Modified Maritime Polar air masses dominated February's weather until the 26th. An arctic cold front pushed through the area on the 25th pushing arctic air into the area.; a storm system developed along the front spreading heavy snow across a good portion of Northern Indiana and Southern Michigan on the night of the 25th. Snowfall totals reached over 10 inches in some locations. Lake effect snowfall occurred across Southwest Michigan and Northwest Indiana dumping another 6 to 10 inches by the 27th. An average of 0.61 inches of snow water equivalent was in the snow that fell across the area (COOP Data). The snow tapered off to flurries as February ended. The coldest day of the month was the morning of the 28th as temperatures fell into the single digits at both Fort Wayne and South Bend.

In February, 2002, 4 Flood Warnings (FLWs) and 25 Flood Statements (FLSs) were issued by WFO IWX to cover February river flooding. All rivers receded back into their banks by the 8th and remained below flood stage as February ended.

NWS FORM E-5

U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN
REPORT FOR (MONTH & YEAR):
March 2002

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
April 9th, 2002

TO: NATIONAL WEATHER SERVICE (W/OH12X1)
HYDROMETEOROLOGICAL INFO CENTER
1325 EAST-WEST HIGHWAY, RM 7116
SILVER SPRING, MD 20910

SIGNATURE:
Michael Sabones, MIC
Greg Lamberty, Service Hydrologist

When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (WSOM E-41).

An **X** inside this box indicates that no flooding occurred within this Hydrologic Service Area.

General Overview: March, 2002 across Northern Indiana, Northwest Ohio and Extreme Southern Michigan brought colder and drier than normal weather across the area. Precipitation totals averaged around a quarter of an inch below normal for March. Temperatures averaged about 2.5 °F below normal. There were 2 significant periods of very cold weather in March which overwhelmed the one period of warm temperatures. The first cold period stretched from 1st through the 5th with temperatures averaging nearly 9 °F below normal. The period of warmer than normal weather stretched from the 6th through the 20th with a short blast of cold weather on the 10th and 11th. Not including the 10th and 11th, temperatures averaged 6.3 °F above normal. The final stretch of cold weather extended from the 21st through the 29th with temperatures averaging 10.0 °F below normal.

The temperature finally fell below 0 °F for the first time this winter on the 4th. At South Bend the temperature bottomed at -3 °F (Record Low). The temperature remained above 0 °F at Fort Wayne settling at +3 °F. The warmest temperature for March, 2002 occurred shortly after that when the temperature reached 69 °F at Fort Wayne on the 8th. The high temperature reached 62 °F on the same day at South Bend.

For the month of March, the average high temperature was in the middle 40s, the average low temperature was in the middle 20s giving an average temperature in the middle 30s. 7.3 inches of snow fell at Fort Wayne and 14.2 inches of snow fell at South Bend in March 2002. (Only NWS Fort Wayne and South Bend data were used). There were 2 bouts of snow, each coinciding with the cold spells.

Much of the river flooding in March was caused by snow melt. There were flooding events on the 5th and the 9th as minor flooding occurred along the Tiffin and Kankakee Rivers. These flood events were caused by a combination of rain and snow melt. 2 flood warnings (FLWs) were issued for those events. Flooding subsided until the 29th when a snow pack of nearly a foot in some locations built up as a result of the 25th through the 27th snow event melted as moderate rainfall and warmer temperatures moved into the area

by the 29th. 6 more flood warnings (FLWs) were issued to cover the flooding. The Maumee, Tiffin, St. Marys, Wabash, Salamonie and Auglaize Rivers flooded as a result of this event. The river flooding continued across Northeast Indiana and Northwest Ohio into early April.

There were 3 significant precipitation events in March, 2002. The first one occurred from the 2nd through the 3rd when an average of around 0.6 inches of precipitation fell across the area (COOP Data). Much of the precipitation was snow across Northwest Indiana and Southwest Michigan. Southeast of there, rain dominated the weather event. A 3 to 7 inch snow pack was present across extreme Northern Indiana, Extreme Southern Michigan and Northwest Ohio as the month began. Much of the snow melted on the 2nd with the greater melt occurring over Northwest Ohio. This caused the Tiffin River to flood on the 5th. A second rain event caused flooding along the Kankakee River on the 9th. An average of nearly 0.80 inches fell across the area (COOP Data). This rainfall melted any remaining snow which contributed to the flooding along the Kankakee River.

All flooding ended by the middle of the month. The third precipitation event, a snow event, occurred from the 25 through the 27th as an average of nearly 9 inches fell across the area (COOP Data). Snow water equivalent of nearly an inch was in the new snow pack. Around a foot of snow accumulated in some locations in Northeast Indiana and Northwest Ohio.

Being March, The snow melted on the 28th and 29th and the snow melt combined with an average third of an inch rain event on the 29th (COOP Data) resulted in more flooding. All of the flooding occurred in Northeast Indiana and Northwest Ohio. The Wabash, Tiffin, St. Marys, Maumee, Auglaize and Salamonie Rivers went out of their banks as a result of the snow melt/rain event. Flooding continued into early April. 2 flood statements were issued on the 29th to alert the public to beware of flooding streets and small streams and creeks across 4 counties in Northwest Ohio. This flooding was caused mainly by snow melt and moderate rains. A Hydrologic Outlook was issued on the 22nd to cover the snow melt flood threat.

The Palmer Drought Severity Index for the period ending April 6th continued to show moist soil conditions. Unusually moist to very moist soil conditions prevailed across the entire region. Palmer Drought Severity Indices ranged from +2.74 (Unusually Moist) for Southwest Michigan to +3.74 (Very Moist) for Southeast Michigan. North Central (+3.71) and Northeast Indiana (+3.61) had very moist soils. Northwest Indiana (+2.96) and South Central Michigan (+2.88) and Northwest Ohio(+2.91) had unusually moist soils.

Temperature: For Fort Wayne, the average high temperature in March, 2002 was 45.6 °F the average low was 27.2 °F. This gave an average temperature of 36.4 °F which was 1.7 °F below normal. At South Bend, the average high temperature was 43.4 °F and the

average low was 25.0 °F giving an average temperature of 34.2 °F which was 3.3 °F below normal for March. A record low temperature of -3 °F was set at South Bend on the 4th.

Precipitation: Precipitation averaged around a quarter of an inch below normal at Fort Wayne and South Bend in March, 2002. At Fort Wayne 2.56 inches of precipitation fell, 0.30 inches below normal for March. At South Bend 2.77 inches of precipitation fell, 0.12 inches below normal for March. Snowfall was above normal. 14.2 inches of snow fell at South Bend, normal is 9.7 inches. 7.3 inches of snow fell at Fort Wayne in March, 2002, normal is 5.3 inches.

Weather: There were 3 significant precipitation events in March, 2002. The first occurred on the 2nd and 3rd. It was a rain and snow event with an average of around a 0.6 inch precipitation amounts (COOP Data). Much of the precipitation was snow across Northwest Indiana and Southwest Michigan with mostly rain southeast. The second event was primarily a rain event and occurred from 8th to the 9th. An average of nearly 0.80 inches fell across the area (COOP Data). The third event was primarily a snow event with an average of 9 inches of snowfall across the area. Some locations in Northwest Ohio and Northeast Indiana (COOP Data) recorded a foot of snowfall. This event occurred from the 25th through the 27th.

March started out with high temperatures in the middle 30s. Temperatures quickly fell as a strong cold front swept through the area on the 3rd, bringing arctic air into the area. Temperatures fell to their lowest levels of the winter with South Bend recording a record -3 °F on the morning of the 4th. Much of the snow pack was centered over Northwest Indiana and Southwest Michigan at this time. There was only a trace of snow on the ground at Fort Wayne thus the temperature only fell to +3 °F on morning of the 4th. Temperatures climbed into the middle 40s northwest to the middle 50s east by the 6th as the warmer March sun modified the Arctic air mass. This began a nearly 2 week period of warmer than normal temperatures. Modified Maritime polar air dominated this period and it was mostly dry. The warmest temperatures for this March occurred on the 8th with highs reaching near 70 °F at some locations.

A quick shot of arctic air moved into the area on the 10th and 11th dropping high temperatures into the 25 °F to 30 °F range on the 10th. This cold spell was preceded by a 2 day rain event which occurred on the 8th and 9th.

Temperatures warmed back into the upper 50s to lower 60s by the 13th as the arctic air was quickly modified by the warm March sun. Temperature remained above normal into the 21st when another punch of arctic air drove high temperatures down into the 30s. The third precipitation event moved into the area as storm systems out of the Southern Plains spread primarily snow.

High temperatures returned to the 40s on the 28th and to the 50s by the 30th. This warm up caused a quick snow melt. The snow melt combined with a moderate rain across the area on the 29th led to the flooding in Northeast Indiana and Northwest Ohio.

In March, 2002, 8 Flood Warnings (FLWs) and 13 Flood Statements (FLSs) were issued by WFO IWX to cover March river flooding. 2 Flood Statements (FLSs) were issued for street and small stream flooding in Northwest Ohio.

Low agricultural land and roads near the affected rivers were flooded as a result of the March flooding.

NWS FORM E-5

U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN
REPORT FOR (MONTH & YEAR):
April 2002

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
May 9th, 2002

TO: NATIONAL WEATHER SERVICE (W/OH12X1)
HYDROMETEOROLOGICAL INFO CENTER
1325 EAST-WEST HIGHWAY, RM 7116
SILVER SPRING, MD 20910

SIGNATURE:
Michael Sabones, MIC
Greg Lamberty, Service Hydrologist

When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (WSOM E-41).

An **X** inside this box indicates that no flooding occurred within this Hydrologic Service Area.

General Overview: April, 2002 across Northern Indiana, Northwest Ohio and Extreme Southern Michigan was warmer than normal and precipitation totals were around normal. Precipitation totals averaged around less than a tenth of an inch below normal and temperatures averaged about 2.4 °F above normal. April 2002 divided into three temperature regimes, one very warm period surrounded by 2 cold periods. The first 10 days and the last 10 days of the month had temperatures that averaged below normal with the middle 10 days well above normal. Several warm temperature records were broken during this time period. (Only NWS Fort Wayne and South Bend data were used).

For the month of April, the average high temperature was in the lower 60s, the average low temperature was in the lower 40s giving an average temperature in the lower 50s. A trace of snow fell at Fort Wayne and 0.3 inches of snow fell at South Bend in April 2002. (Only NWS Fort Wayne and South Bend data were used).

The month of April started out with minor flooding resulting from moderate rainfall and snowmelt that occurred late in March. The Maumee, Auglaize, St. Marys, Tiffin and Wabash Rivers were above flood stage as April began and crested early in the month. All river levels were falling, however their falls were slowed by rains from the 1st through the 3rd when an average of over 0.6 inches of rain fell across the area (Coop Data). That rain was enough to push the St. Joseph River (Ohio) and Kankakee Rivers over flood stage. Warnings were issued for the St. Joseph River (Ohio) and the Kankakee River on the 3rd to cover this flooding.

Moderate to heavy rains fell from the 7th through the 9th with one inch average rainfall (Coop Data). As a result, flooding occurred along the Kankakee and St. Joseph Rivers (Ohio). Flood warnings were issued to cover this flooding threat. More flooding was expected along the Maumee, St. Marys and Tippecanoe Rivers but it did not materialize.

A third rain event occurred from the 12th through the 13th of the month when an average of around a half inch fell across the area (Coop Data). Flooding occurred along the Eel

River as a result, but no renewed flooding was observed elsewhere. More flooding was expected along the St. Joseph River (Ohio), but it did not occur.

All rivers were back in their banks by the 17th, with the Tiffin being the last to go back into its banks.

There were two more significant rain events in April; the 19th through the 22nd when an average of nearly three quarters of an inch occurred (Coop Data) and the 27th through the 29th when an average of around 0.8 inches fell (Coop Data). Neither of these rain events caused any flooding along area rivers. There was rapid vegetation growth in the last half of the month which served to decrease resulting runoff into area rivers and streams.

The Palmer Drought Severity Index for the period ending May 4th showed some drying of area soils. However over most of the area, soil moisture remained above normal. Unusually moist soil conditions prevailed across most of the area with South Central Michigan and Northwest Ohio being on the high side of the normal category. Palmer Drought Severity Indices ranged from +1.61 (Near Normal) for Northwest Ohio to +2.90 (Unusually Moist) for North Central Indiana. Northwest (+2.29) and Northeast Indiana (+2.44) had unusually moist soils. Southwest (+2.18) and Southeast Michigan (+2.48) also had unusually moist soils. South Central Michigan (+1.80) had near normal soil moisture.

Temperature: For Fort Wayne, the average high temperature in April, 2002 was 62.1 °F the average low was 42.3 °F. This gave an average temperature of 52.2 °F which was 3.2 °F above normal. At South Bend, the average high temperature was 59.5 °F and the average low was 40.1 °F giving an average temperature of 49.8 °F which was 1.5 °F above normal for April. There were a series of warm weather temperatures records set from April 15th through April 18th. At Fort Wayne, record high temperatures were set at 85 °F on the 15th, 16th and 17th. A record high temperature of 87 °F was set at Fort Wayne on the 18th. Record high minimum temperatures were set at Fort Wayne on the 15th (61 °F), 17th (66 °F) and the 18th (62 °F). At South Bend, record high temperatures were set on the 15th (87 °F) and on the 18th (86 °F). Record high minimum temperatures were set at South Bend on the 16th (66 °F), 17th (65 °F) and the 18th (64 °F).

Precipitation: Precipitation averaged around normal at Fort Wayne and South Bend in April, 2002. At Fort Wayne 3.70 inches of precipitation fell, 0.16 inches above normal. At South Bend 3.40 inches of precipitation fell, 0.22 inches below normal. A trace of snow fell at Fort Wayne and 0.3 inches at South Bend in April, 2002.

Weather: April, 2002 was a month of great contrasts which is typical for an April. The first 10 days were cold, the middle 10 days were summer like and the third 10 days were cold again. Maritime tropical air dominated the middle 10 days and Maritime polar air dominated the first and third 10 day periods. Snow fell during the first 5 days of the

month. Snowfall amounts were generally an inch or less across the area with most of the reports being a trace. Accumulating snow fell over Northwest Indiana with minor accumulations reported. The snow melted rapidly and caused no problems hydrologically. April started out with high temperatures in the middle to upper 40s. With the exception of a 61 °F high at Fort Wayne on the 2nd, high temperatures were in the upper 30s to the 40s through the 6th. High temperatures then began a slow rise into the 50s and 60s through the 10th. Two storm system brought rain/snow to the area from the 1st through the 3rd with light rain/snow falling on the 4th and 5th. Another storm system moved through the area on the 7th through the 9th bringing moderate to heavy rain to the area along with a last shot of cold air to the region.

Once that storm system moved east, warm air built in driving high temperatures into the 70s by the 11th. Another storm system brought moderate rain to the area on the 12th and 13th. The real warm air followed that storm system. High temperatures rose into the 80s by the 15th and stayed in that range through the 19th. Several warm temperature records were broken during this time period at both Fort Wayne and South Bend.

Another storm system moved into the area on the 19th bringing rain to the area. Cold air spilled over the area from the northwest as the storm pulled away to the east. High temperatures fell into the 50s and lower 60s on the 20th. High temperatures remained in that range with the exception of a 73 °F high at Fort Wayne on the 24th through the end of the month. Another storm system pushed rain across the area on the 27th through the 29th followed by another cold air mass. High temperatures were in the 50s as April ended.

In April, 2002, 7 Flood Warnings (FLWs) and 45 Flood Statements (FLSs) were issued by WFO IWX to cover April river flooding.

All flooding in April was in the minor category with low lands nearest the rivers flooding. No flood damage was reported.

NWS FORM E-5

U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH & YEAR):
May 2002

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
June 11th , 2002

TO: NATIONAL WEATHER SERVICE (W/OH12X1)
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General Overview: May, 2002 across Northern Indiana, Northwest Ohio and Extreme Southern Michigan was much cooler and much wetter than normal. Precipitation totals averaged 2.40 inches above normal. Temperatures averaged 4.6 °F below normal. (Only NWS Fort Wayne and South Bend data were used).

For the month of May, the average high temperature was in the middle 60s, the average low temperature was in the middle 40s giving an average temperature in the middle 50s. (Only NWS Fort Wayne and South Bend data were used).

There were 6 significant rainfall events over Northern Indiana, Southern Michigan and Northwest Ohio in May 2002. The most significant one occurred from the 11th through the 14th when an average of around 2 inches of rain fell across the area (COOP Data). Most of the rain fell on the night of the 11th and the morning of the 12th. An unofficial report of 4.70 inches was received in Goshen Indiana for the 11th and 12th of May. Other reports of 3 or more inches for the same time period were received from Elkhart and St. Joseph Counties in Indiana. This rainfall event led to the most significant flooding of the year. Moderate flooding occurred at some point along the Tiffin, Elkhart, Kankakee, St. Joseph (Ohio) and Tippecanoe Rivers in Northern Indiana and Northwest Ohio. Minor flooding occurred along the Eel, Wabash, St. Joseph (Michigan), and the Yellow Rivers. There was minor flooding along the Fish Creek in Northeast Indiana as well.

May began with all area river levels below flood stage. Two rain events occurred before the big one. The first lasted from the 1st through the 2nd producing an average of around 0.40 inch of rain (COOP Data). Minor rises occurred on area rivers in response to the rainfall, but no flooding occurred. The second event began on the 5th and lasted into the 10th. An average rain of nearly one inch fell in this event (COOP Data). Much of the rain fell on the 8th and the 9th totaling between a half and three quarters of an inch (COOP Data). Area rivers and streams did not respond until the 10th. The rises were moderate leading to no flooding, but with each rain event, river levels crept toward flood stage. The third event was the big one.

A Flood Watch was issued for the evening of the 11th and for the entire day of the 12th. The first flood warnings (FLWs) were issued on the 11th for the Tippecanoe, Kankakee and Elkhart Rivers. Flood Warnings (FLWs) were issued in response to this event from the 12th through the 15th. Rivers affected by flooding, in addition to the Tippecanoe, Kankakee and Elkhart, were the St. Joseph (Michigan), the Tiffin, the Wabash, the Yellow, the Eel and the St. Joseph (Ohio) Rivers. A Flash Flood Warning was issued for Fulton County Ohio on the morning of the 12th to cover flash flooding. Three homes were evacuated and one person had to be rescued from a vehicle as a result of the flooding. A Flood Statement (FLS) was issued later on the 12th for Fulton County Ohio to cover urban and small stream flooding there. A total of one Flood Watch (FFA) consisting of 2 statements (FFAs), 20 Flood Warnings (FLWs), 54 Flood Statements (FLSs) and one Flash Flood Warning (FFW) were issued to cover the flooding from the heavy rains of the 11th through the 14th.

The fourth event occurred from the 15th through the 18th with an average rainfall amount of around two thirds of an inch (COOP Data). In response to the new rainfall, 3 Flood Warnings (FLWs) were issued for the St. Marys, St. Joseph (Michigan) and the Maumee Rivers. None of these points flooded as the rainfall was less than expected.

Most of the rivers crested by the 15th and were falling. Two more rainfall events followed: one lasting from the 24th through the 26th producing an average half inch of rain (COOP Data), the other lasting from the 27th through the 31st with 0.40 inches of rain (COOP Data). Neither of these two events led to renewed flooding. However showers and thunderstorms triggered the issuance of 2 Flood Statements (FLSs) for Wells, Blackford and Grant Counties in Northern Indiana on the 28th of May. Otherwise, runoff values were reduced because of rapid vegetation growth which helped to reduce any renewed flood threat. All of the area rivers and streams were back in their banks by the 22nd.

The Palmer Drought Severity Index for the period ending June 1st continued to show moist area soils. Unusually moist soil conditions prevailed across the entire area with the exception of Northwest Ohio where soil moisture slipped back to the high end of the near normal category. Palmer Drought Severity Indices ranged from +1.84 (Near Normal) for Northwest Ohio to +2.99 (Unusually Moist) for North Central Indiana. Northwest (+2.13) and Northeast Indiana (+2.84) had unusually moist soils. Southwest (+2.14), South Central Michigan (+2.09) and Southeast Michigan (+2.00) also had unusually moist soil moisture conditions.

Temperature: For Fort Wayne, the average high temperature in May, 2002 was 67.1 °F the average low was 45.8 °F. This gave an average temperature of 56.5 °F which was 3.9 °F below normal. A record low was set on the morning of the 19th (30 °F). May, 2002 was the 12th coldest on record at Fort Wayne. At South Bend, the average high temperature was 64.6 °F and the average low was 44.0 °F giving an average temperature of 54.3 °F which was 5.3 °F below normal for May. Record lows were set at South Bend on the mornings of the 18th (33 °F), the 19th (32 °F) and the 21st (30 °F). May, 2002 was the 6th coldest on record at South Bend.

Precipitation: Precipitation was well above normal at both Fort Wayne and South Bend in May, 2002. At Fort Wayne 6.29 inches of rain fell, 2.54 inches above normal. May, 2002 was the 8th wettest on record at Fort Wayne. At South Bend, 5.75 inches of rain fell, 2.25 inches above normal. May, 2002 was the 7th wettest on record at South Bend. A record 1.45 inches of rain fell at South Bend on the 12th.

Weather: May, 2002 started out with temperatures below normal through the 4th. There was a three day warm up before the bottom fell out of the temperatures beginning on the 8th. The coldest temperatures occurred from the 17th through the 21st. High temperatures were only in the 40s and 50s through this time period. Lows were mostly in the 30s. Record low temperatures were set at South Bend on the 18th, 19th and 21st. A record low temperature was set on the 19th at Fort Wayne.

The first 4 days averaged around 5 °F below normal across the area. Maritime Polar air was the dominant airmass through the 4th. High temperatures were in the 50s and 60s. The first rain event occurred on the 1st and the 2nd. Maritime Tropical air moved into the area on the 5th driving high temperatures into the 70s. Temperatures for this time period averaged nearly 6 °F above normal.

A cold front moved through the area on the 7th coinciding with the 2nd rain event. This was the beginning of a major shift to Maritime Polar airmass dominance. This dominance lasted from the 8th through the 27th. In addition to the cold, a series of storms systems moving across the area from the southwest brought the most significant rain amounts of the month to the region. The rain event of the 11th through the 14th brought flooding along many area rivers and streams with some of it reaching the moderate category. Record low temperatures occurred at both Fort Wayne and South Bend following the heavy rain event. Temperatures averaged over 8 °F below normal from the 8th through the 27th.

Warmer air finally made its return to the area on the 28th. This return coincided with the final rain event of the month. Heavy rains over parts of North Central Indiana prompted the issuance of Flood Statements (FLSs) to alert the public to the possibility of street and small stream flooding. After the rains subsided, high temperatures reached the 80s as the month ended. Temperatures averaged nearly 7 °F above normal over the final 4 days of May.

All temperature data was derived from South Bend and Fort Wayne station records.

In May, 2002, 23 Flood Warnings (FLWs), 60 Flood Statements (FLSs), one Flash Flood Warning (FFW), one Flash Flood Statement (FFS) and 2 Flood Watch Statements (FFAs) were issued by WFO IWX to cover May flooding.

There was moderate flooding at 7 forecast points in May, 2002 with the rest in the minor category.

Flooding that occurred in the middle of the month resulted in much lowland and agricultural flooding. There was basement flooding in homes along the Elkhart and St.

Joseph Rivers in Elkhart County Indiana. A golf course flooded and 2 homes were evacuated in Elkhart County as well. This occurred over the weekend of the 11th through the 14th of May. Three homes were flooded in Fulton County Ohio as a result of the flash flooding which occurred on the morning of the 12th. Roads were closed as a result of flooding in Fulton, Elkhart, Miami and Starke Counties in Indiana and Williams County in Northwest Ohio. 2 houses were also flooded in Williams County, Ohio near Pioneer as well. Basements were flooded in White County in Indiana. No dollar amount of the damage was received.

NWS FORM E-5

U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH & YEAR):
June, 2002

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
July 9th, 2002

TO: NATIONAL WEATHER SERVICE (W/OH12X1)
HYDROMETEOROLOGICAL INFO CENTER
1325 EAST-WEST HIGHWAY, RM 7116
SILVER SPRING, MD 20910

SIGNATURE:
Michael Sabones, MIC
Greg Lamberty, Service Hydrologist

When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (WSOM E-41).

An **X** inside this box indicates that no flooding occurred within this Hydrologic Service Area.

General Overview: June, 2002 across Northern Indiana, Northwest Ohio and Extreme Southern Michigan was warmer and drier than normal. Precipitation totals averaged 1.92 inches below normal. Temperatures averaged 1.9 °F above normal. (Only NWS Fort Wayne and South Bend data were used).

For the month of June, the average high temperature was in the lower 80s, the average low temperature was in the lower 60s giving an average temperature in the lower 70s. (Only NWS Fort Wayne and South Bend data were used).

There were three significant rain events across Northern Indiana, Southern Michigan and Northwest Ohio in June, 2002. The first occurred from the 3rd through the 6th when an average of just under an inch of rain fell (COOP Data). The duration of rain was long, so there was no flood threat with this event. The second event stretched from the 10th through the 18th. This event produced only an average of just over a half inch of rainfall (COOP Data). Again, this rain event lasted over a week and had no effect on river levels. The third event stretched from the 26th to the 27th. This rain event, concentrated its fury on one place, Fort Wayne and Allen County Indiana. Massive flash flooding stretched from the west side through the center of town. The average rainfall across the entire area was about an inch (COOP Data), but there were reports of four and a half to as much as eight inches of rain over the City of Fort Wayne. Two Flash Flood Warning (FFWs) were issued for Allen County, including the City of Fort Wayne on the night of the 26th and the morning of the 27th. Much of the rain fell in the water shed drained by Spy Run Creek. The creek rose to a record 12.30 feet around 3 AM on the 27th. The creek empties into the Maumee River which rose to within a foot and a half of flood stage at the downtown Fort Wayne river gauge. Downstream, from Downtown Fort Wayne, the Maumee River level touched flood stage at New Haven Indiana.

There was massive damage to buildings in the city from the flooding. There have been reports that one building, the Fort Wayne Housing Authority, suffered \$750 thousand worth of damage due to the flooding. During the flooding, there were many rescues of motorists from vehicles stranded by flood water. The Fort Wayne Fire Department

assisted 70 disabled vehicles during the flood event (Fort Wayne Journal Gazette). There have been reports of severe water damage to at least a dozen houses where basements collapsed as a result of high water. This was the only serious flood event in June, 2002. No flooding was observed in other areas in Northern Indiana, Southern Michigan or Northwest Ohio.

The Palmer Drought Severity Index for the period ending June 29th showed a marked drying trend in soil moisture. Only North Central and Northeast Indiana remained in positive territory. All areas, however continued to be in the normal soil moisture category for June 2002. Palmer Drought Severity Indices ranged from +2.05 (Unusually Moist) in Northeast Indiana to -0.52 (Near Normal) in Southeast Michigan. Northwest (-0.28) and North Central Indiana (+1.14), Southwest (-0.13) and South Central Michigan (-0.48) and Northwest Ohio (-0.24) had near normal soil moisture conditions.

Temperature: For Fort Wayne, the average high temperature in June, 2002 was 82.4 °F the average low was 60.2 °F. This gave an average temperature of 71.3 °F which was 1.6 °F above normal. At South Bend, the average high temperature was 81.8 °F and the average low was 60.5 °F giving an average temperature of 71.2 °F which was 2.2 °F above normal for June. South Bend had the 12th warmest June on record.

Precipitation: Precipitation was well below normal at both Fort Wayne and South Bend in June, 2002. At Fort Wayne 3.13 inches of rain fell, 0.91 inches below normal. At South Bend, 1.26 inches of rain fell, 2.93 inches below normal. June, 2002 was the 4th driest on record at South Bend.

Weather: June, 2002 started out warmer than normal with high temperatures in the upper 80s on the 1st. A cold front moved through the area on the 3rd bringing showers and thunderstorms to Northern Indiana, Southern Michigan, and Northwest Ohio. An average of nearly an inch of rain fell from the 3rd through the 6th (COOP Data). No flood problems were reported in this event. Cooler air moved into the area behind the front pushing temperatures below normal from the 3rd through the 8th. An exception was the 4th which still had above normal temperatures. High temperatures were pushed into the lower 70s on the 3rd and after a rise on the 4th, fell into the middle 60s by the 5th and 6th. Continental Polar was the dominant air mass across the area most of this time.

Temperatures warmed back up into the upper 80s by the 9th as Maritime Tropical air spread into the area from the south. However, cooler weather again moved in behind a cold front spilling Continental Polar air across the area on the 12th. Beginning on the 13th high temperatures were pushed down into the lower 70s and upper 60s. Temperatures were below normal from the 13th through the 18th. Spotty showers and thunderstorms fell across the area from the 10th through the 18th with a total average rainfall amount of around a half inch (COOP Data). Again with the long duration and the minor amounts, no flooding was observed.

Temperatures rebounded on the 19th into the upper 80s as Continental Tropical air swept into the region from the south. Temperatures pushed into the 90s for the first time of the year on the 20th. High temperatures remained in the upper 80s and lower 90s from the 20th

through the 26th. Another weak cold front approached Northern Indiana, Southern Michigan and Northwest Ohio on the 26th. Just spotty showers and thunderstorms developed ahead of the front, (an average of an inch across the entire area (COOP Data)) but intense showers and thunderstorms developed over Northeast Indiana and moved over Allen County and the City of Fort Wayne. These storms continued to redevelop and move over the same area for several hours. Torrential rains dumped up to eight inches of rain over a part of Fort Wayne triggering massive flash flooding and flood damage. Cooler weather followed the weak front and Continental Polar air dropped high temperatures into the lower 80s on the 27th and 28th.

That cooler weather did not last long as high temperatures rose back into the lower 90s with the return of Maritime Tropical air as June closed.

In June, 2002, 2 Flash Flood Warnings (FFWs), 2 Flash Flood Statements (FFSs) and 4 Flood Statements (FLSs) were issued by WFO IWX to cover the Allen County and Fort Wayne flooding on the 26th and 27th of June.

NWS FORM E-5

U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH & YEAR):
July, 2002

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
August 9th, 2002

TO: NATIONAL WEATHER SERVICE (W/OH12X1)
HYDROMETEOROLOGICAL INFO CENTER
1325 EAST-WEST HIGHWAY, RM 7116
SILVER SPRING, MD 20910

SIGNATURE:
Michael Sabones, MIC
Greg Lamberty, Service Hydrologist

When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (WSOM E-41).

An **X** inside this box indicates that no flooding occurred within this Hydrologic Service Area.

General Overview: July, 2002 across Northern Indiana, Northwest Ohio and Extreme Southern Michigan was warmer and drier than normal. Precipitation totals averaged 1.22 inches below normal. Temperatures averaged 3.5 °F above normal. (Only NWS Fort Wayne and South Bend data were used).

For the month of July, the average high temperature was in the upper 80s, the average low temperature was in the middle 60s giving an average temperature in the upper 70s. (Only NWS Fort Wayne and South Bend data were used).

There was only one significant rain event across Northern Indiana, Southern Michigan and Northwest Ohio in July, 2002. This event stretched from the 26th through the 30th of the month. The rainfall was convective in nature, therefore coverage was spotty. An average of one and two thirds inches fell across the area (COOP Data). River levels were very low at the time, thus no widespread flooding resulted from these rains. Much of the rain that occurred in July fell as a result of thunderstorms. With very moist air, these storms generated very heavy rains which could result in localized flooding of small streams and creeks and flood prone roadways. 5 Flood Statements (FLSs) were issued to cover this type of flood threat for 14 counties in Northern Indiana and Southern Michigan. Twelve of these counties were affected on the 9th when a slow moving line of thunderstorms moved over Southern Michigan and Northern Indiana. More isolated events occurred on the 19th and on the 26th. Flooded roads and underpasses were reported by St. Joseph County Indiana Sheriff's Department in Southern St. Joseph County on the July 26th.

The Palmer Drought Severity Index for the period ending July 27th showed a continued drying trend in soil moisture. All areas had below zero readings on the Palmer Drought Severity Index. The Palmer Drought Severity Indices ranged from -0.52 (Near Normal) over Northeast Indiana to -2.56 (Moderate Drought) over Northwest Ohio. Southwest Michigan (-2.19) was in moderate drought. Northwest (-1.99) and North Central Indiana (-1.55) along with South Central (-1.27) and Southeast Michigan (-1.60) were on the lower end of the normal soil moisture range.

Temperature: For Fort Wayne, the average high temperature in July, 2002 was 87.9 °F the average low was 65.1 °F. This gave an average temperature of 76.5 °F which was 3.1 °F above normal. At South Bend, the average high temperature was 87.2 °F and the average low was 66.3 °F giving an average temperature of 76.8 °F which was 3.8 °F above normal for July. South Bend had the 4th warmest July on record. It reached 96 °F at South Bend on the 21st. At Fort Wayne, the warmest temperature was 94 °F reached on the 4th, 21st and 22nd.

Precipitation: Precipitation was below normal at both Fort Wayne and South Bend in July, 2002. At Fort Wayne 2.40 inches of rain fell, 1.18 inches below normal. At South Bend, 2.47 inches of rain fell, 1.26 inches below normal.

Weather: July, 2002 was a hot and humid month, for the most part, across the entire area. The month began with four straight high temperatures at or above 90 degrees. Maritime Tropical Air dominated the region's weather. A weak cold front pushed through the area on the 4th with no rainfall. High temperatures fell into the lower to middle 80s on the 5th and 6th.

Warm air then moved back into the area on the 7th causing high temperatures to rise into the upper 80s to lower 90s through the 8th. A stronger cold front pushed into the area from Canada bringing cooler weather. A slow line of thunderstorms developed over Michigan and slipped south into Northern Indiana on the morning of the 9th. Heavy rains prompted the issuance of flood statements for urban and small stream flooding threat over Southern Michigan and Northern Indiana. High temperatures were pushed down into the upper 70s and lower 80s from the 10th through the 13th by the cooler Canadian air which followed the cold front south.

Another warm spell broke out over Northern Indiana, Southern Michigan and Northwest Ohio on the 14th and lasted until the 22nd. There were scattered rains from the 17th through the 20th and again on the 22nd and 23rd. Since these rains were caused by thunderstorms, very heavy rain over a short time did occur. Heavy rains prompted a flood statement for urban and small stream flooding to be issued for Grant County in Northern Indiana on the 19th. The cold front passed through the area on the 22nd causing high temperatures to fall into the lower 80s on the 23rd of the month along with more scattered rains.

High temperatures remained in the upper 70s and lower 80s through the 25th as Canadian high pressure dominated the area's weather. Warmer weather returned on the 26th driving high temperatures into the middle to upper 80s and into the lower 90s by the 30th.

This air mass was more stormy. Bouts of showers and thunderstorms occurred from the 26th through the 30th. A series of intense thunderstorms developed and moved over Southern St. Joseph County in Indiana on the 26th causing some locations there to receive over five inches of rain in a short period of time. Two flood statements (FLSs) were issued to cover street and small stream flooding in that area. A more general shower and

thunderstorm area crossed the region on the 29th bring spotty one inch or greater amounts across the entire region. The front passed through the area on the 29thdropped high temperatures into the middle to upper 80s on the 30th. Temperatures, however, quickly rebounded into 90s on the 31st.

In July, 2002, 5 Flood Statements (FLSs) were issued by WFO IWX to cover localized flooding threats across Northern Indiana and Southern Michigan.

NWS FORM E-5

U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH & YEAR):
August, 2002

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
September 9th, 2002

TO: NATIONAL WEATHER SERVICE (W/OH12X1)
HYDROMETEOROLOGICAL INFO CENTER
1325 EAST-WEST HIGHWAY, RM 7116
SILVER SPRING, MD 20910

SIGNATURE:
Michael Sabones, MIC
Greg Lamberty, Service Hydrologist

When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (WSOM E-41).

X An **X** inside this box indicates that no flooding occurred within this Hydrologic Service Area.

General Overview: August, 2002 across Northern Indiana, Northwest Ohio and Extreme Southern Michigan was warmer and drier than normal. Precipitation totals averaged 1.24 inches below normal. Temperatures averaged 1.7 °F above normal. (Only NWS Fort Wayne and South Bend data were used).

For the month of August, the average high temperature was in the lower 80s, the average low temperature was in the lower 60s giving an average temperature in the lower 70s. (Only NWS Fort Wayne and South Bend data were used).

There were four significant rain events across Northern Indiana, Southern Michigan and Northwest Ohio in August, 2002. The first one occurred from the 2nd through the 3rd. This event produced an average of around a third of an inch (COOP Data). The second event occurred from the 14th through the 17th and produced an average of around 0.8 inches (COOP Data). The third rain event occurred from the 19th through the 20th of August with an average of around 0.9 inches (COOP Data). The last rain event in August lasted from the 23rd through the 25th with an average rainfall amount of around 0.9 inches (COOP Data). All of the rainfall was convective in nature so amounts were spotty across the area. River levels were low and soils were quite dry so no flooding occurred in August.

Much of the rain that occurred in August fell as a result of thunderstorms. The most significant localized rain event occurred on the 22nd and 23rd where locally over two inches amounts fell in Fort Wayne.

The Palmer Drought Severity Index for the period ending August 31st showed some improvement in soil moisture from late July. However, moderate drought continued over North Central Indiana, Southeast Michigan and Northwest Ohio. The Palmer Drought Severity Indices ranged from -0.35 (Near Normal) over Northeast Indiana to -2.75 (Moderate Drought) over Southeast Michigan. Southwest (-0.81) and South Central Michigan (-1.09) along with Northwest Indiana (-1.52) were in the near normal soil moisture range while North Central Indiana (-1.98) and Northwest Ohio (-2.09) had

moderate drought.

Temperature: For Fort Wayne, the average high temperature in August, 2002 was 82.6 °F the average low was 62.6 °F. This gave an average temperature of 72.6 °F which was 1.5 °F above normal. At South Bend, the average high temperature was 82.9 °F and the average low was 62.7 °F giving an average temperature of 72.8 °F which was 1.8 °F above normal for August. The warmest temperature occurred on the 4th at Fort Wayne when the mercury reached 93 °F. The warmest temperature occurred on the 1st at South Bend when 92 °F was reached.

Precipitation: Precipitation was below normal at both Fort Wayne and South Bend in August, 2002. At Fort Wayne 2.79 inches of rain fell, 0.81 inches below normal. At South Bend, 2.31 inches of rain fell, 1.67 inches below normal.

Weather: August, 2002 was a warm and humid month across the entire area. The month began with above normal temperatures. The warmest day of the month occurred during the first 4 days. A weak cold front crossed the area on the 2nd and 3rd. Showers and thunderstorms associated with the front produced about a third of an inch of rain (COOP Data) across Northern Indiana, Southern Michigan and Northwest Ohio. Maritime Tropical air was briefly replaced with Continental Polar air. Maritime Tropical air again overspread the area as high temperatures rebounded into the lower 90s on the 4th.

Another cold front advanced through the area on the 5th. This front was stronger than the earlier one, but little precipitation occurred with its passage. High temperatures were cooler following frontal passage as Continental Polar air moved in. High temperatures fell into middle to upper 70s on the 6th and 7th. The cool high pressure then slipped off to the east allowing a return of Maritime Tropical air. High temperatures rose back into the upper 80s by the 10th.

The next rain event overspread the area on the 14th as a weak cold front stalled over the area. This rain event produced an average amount of 0.8 inches (COOP Data) from the 14th through the 17th. Another rain event occurred from the 19th through the 20th producing about 0.9 inches across the area (COOP Data). Both rain events occurred as the front waved back and forth across the area. High temperatures reflected this by oscillating between the middle 70s and middle 80s.

The frontal system finally pushed through the area with the third rain event from the 23rd through the 25th. An average of 0.9 inches fell in this event (COOP Data). A Maritime Polar airmass pushed in behind the front. This cooler and drier air dominated the region's weather through to the end of August with high temperatures mostly in the upper 70s and lower 80s.

In August, 2002, with no flooding, no flood watches, warnings or statements were issued by WFO IWX. Only daily hydro products were issued by WFO IWX in August 2002.

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
October 15th, 2002

TO: NATIONAL WEATHER SERVICE (W/OH12X1)
HYDROMETEOROLOGICAL INFO CENTER
1325 EAST-WEST HIGHWAY, RM 7116
SILVER SPRING, MD 20910

SIGNATURE:
Michael Sabones, MIC
Greg Lamberty, Service Hydrologist

When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (WSOM E-41).

X An X inside this box indicates that no flooding occurred within this Hydrologic Service Area.

General Overview: September, 2002 across Northern Indiana, Northwest Ohio and Extreme Southern Michigan was much warmer and drier than normal. Precipitation totals averaged about 1.5 inches below normal. Temperatures averaged about 4.0 °F above normal. (Only NWS Fort Wayne and South Bend data were used).

For the month of September, the average high temperature was around 80 °F, the average low temperature was in the middle 50s giving an average temperature in the upper 60s. (Only NWS Fort Wayne and South Bend data were used).

There were only two significant rain events across Northern Indiana, Southern Michigan and Northwest Ohio in September, 2002. The first one occurred from the 18th through the 22nd. This event produced an average of around one and a third inches (COOP Data). The second event occurred from the 26th through the 27th and produced an average of around 0.7 inches (COOP Data). Most of the rainfall was convective in nature so amounts were spotty. River levels were low and with dry soils, no flooding occurred in September.

The Palmer Drought Severity Index for the period ending October 5th showed that the area drought worsened. The moderate drought area expanded to cover Northwest and North Central Indiana, South Central and Southeast Michigan and Northwest Ohio. Northeast Indiana and Southwest Michigan continued to be on the dry side of the normal range. The Palmer Drought Severity Index ranged from -1.33 (Near Normal) over Northeast Indiana to -2.66 (Moderate Drought) over North Central Indiana. Southwest Michigan (-1.81) was near normal, Northwest Indiana (-2.29), South Central Michigan (-2.10), Southeast Michigan (-2.36) and Northwest Ohio (-2.12) were in a moderate drought.

Temperature: For Fort Wayne, the average high temperature in September, 2002 was 80.0 °F the average low was 55.0 °F. This gave an average temperature of 67.5 °F which was 3.4 °F above normal. At South Bend, the average high temperature was 80.2 °F and the average low was 56.0 °F giving an average temperature of 68.1 °F which was 4.7 °F above normal for September. The warmest temperature occurred on the 8th and the 9th at

Fort Wayne when the mercury reached 92 °F. The warmest temperature occurred on the 8th at South Bend when 94 °F was reached. September, 2002 was the 3rd warmest at South Bend and the 11th warmest at Fort Wayne on record.

Precipitation: Precipitation was below normal at both Fort Wayne and South Bend in September, 2002. At Fort Wayne 2.54 inches of rain fell, 0.27 inches below normal. At South Bend, 1.16 inches of rain fell, 2.63 inches below normal, the 7th driest September on record at South Bend.

Weather: September, 2002 was very warm. Only 5 days of the 30 days had below normal temperatures. The month began with above normal temperatures with the warmest days of the month occurring on the 8th and 9th with high temperatures reaching the lower 90s at both Fort Wayne and South Bend. The warm temperature streak spanned the 1st through the 10th with high temperatures in the 80s and lower 90s. A cold front with just a few scattered showers passed through Northern Indiana, Southern Michigan and Northwest Ohio on the 10th. High temperatures fell into the middle to upper 70s on the 11th and 12th as Maritime Polar from Canada spilled into the area. This air mass quickly moved back north as Maritime Tropical air overspread the area on the 13th. High temperatures pushed back into the 80s on the 13th and 14th.

A weak cold front pushed through the area on the 14th. It was the focus of widely scattered showers and a few thunderstorms. Rainfall amounts were so widely scattered that on average this event was insignificant. The air behind the front was not that cold. High temperatures moved back into the mid to upper 70s on the 15th and 16th. Temperatures again rebounded into the 80s from the 17th through the 19th with the return of tropical air. High temperatures reached the upper 80s over some locations by the 19th. Scattered showers and thunderstorms began to occur across the area on the 18th as weak weather disturbances passed across Northern Indiana, Southern Michigan and Northwest Ohio. The showery weather kept high temperatures in the 70s. The showery weather ended with the passage of a cold front on the 22nd. Total amount from this rain event was an average of 1.36 inches (COOP Data). With the dry soil conditions, water levels on area rivers and streams showed little increase. All levels remained well below flood stage.

Temperatures finally fell below normal on the 22nd as cooler Maritime Polar air spread across the Lower Great Lakes region. High temperatures were driven down into the 60s from the 22nd through the 24th. A slow warmup began on the 25th with high temperatures rising back into the lower to middle 70s. Another weak cold front tried to move through the area on the 26th and 27th. This system produced an average of 0.69 inches of rain (COOP Data) by the time the event ended. There was little change in temperature with highs remaining in the lower to middle 70s. A warmup began on the 29th and 30th as highs rose back to the lower to middle 80s.

With no flooding, no flood watches, warnings or statements were issued by WFO IWX for September, 2002.

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
November 9, 2002

TO: NATIONAL WEATHER SERVICE (W/OH12X1)
HYDROMETEOROLOGICAL INFO CENTER
1325 EAST-WEST HIGHWAY, RM 7116
SILVER SPRING, MD 20910

SIGNATURE:
Michael Sabones, MIC
Greg Lamberty, Service Hydrologist

When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (WSOM E-41).

X An **X** inside this box indicates that no flooding occurred within this Hydrologic Service Area.

General Overview: October 2002 was cooler and drier than normal across Northern Indiana, Northwest Ohio and Extreme Southern Michigan. Precipitation was about 1.5 inches below normal. Temperatures averaged about 2.6 °F below normal. (Only NWS Fort Wayne and South Bend data were used).

For the month of October, the average high temperature was in the upper 50s, the average low temperature was in the lower 40s giving an average temperature of around 50 °F. (Only NWS Fort Wayne and South Bend data were used).

There were only three significant rain events across Northern Indiana, Southern Michigan and Northwest Ohio in October 2002. The first one occurred on the 4th and produced an average of around a third of an inch (COOP Data). The second event stretched from the 17th through the 19th with an average of little more than 0.4 inches (COOP Data). The third was similar to the second in that an average of little more than 0.4 inches fell (COOP Data). It occurred on the 24th and 25th. There was a minor event on the 29th and 30th (average about 0.2 inches), but the first measurable snow fell with it as Warsaw Indiana reported one inch of snowfall (COOP Data).

The Palmer Drought Severity Index for the period ending November 2 showed that the area drought worsened. Southeast Michigan was upgraded to severe drought. Otherwise, the moderate drought area remained unchanged in October. Northeast Indiana continued to be on the dry end of the near normal category. The numbers are as follows: Northwest Indiana (-2.49 Moderate Drought), North Central Indiana (-2.48 Moderate Drought), Northeast Indiana (-1.34 Near Normal), Southwest Michigan (-2.15 Moderate Drought), South Central Michigan (-2.53 Moderate Drought), Southeast Michigan (-3.02 Severe Drought) and Northwest Ohio (-2.23 Moderate Drought).

With dry soils, and low river flows, these rainfall events did not cause any flooding in Northern Indiana, Extreme Southern Michigan and Northwest Ohio in October 2002.

Temperature: For Fort Wayne, the average high temperature in October 2002 was 59.1 °F and the average low temperature was 40.1 °F. This gave an average temperature of 49.6 °F

which was 2.8 °F below normal. At South Bend, the average high temperature was 58.5 °F and the average low temperature was 41.1°F giving an average temperature of 49.8 °F which was 2.3 °F below normal for October. The warmest temperature occurred on the 1st and the 2nd at Fort Wayne when the mercury reached 84 °F. The warmest temperature occurred on the 1st at South Bend when the high temperature reached 85 °F which tied the record for that date. The record low at South Bend for October 14 was tied when the temperature fell to 32 °F.

Precipitation: Precipitation was below normal at both Fort Wayne and South Bend in October 2002. At Fort Wayne 1.58 inches of rain fell, 1.05 inches below normal. At South Bend, 1.43 inches of rain fell, 1.84 inches below normal. Both locations reported a trace of snowfall.

Weather: October 2002 was quite cool over the Western Lower Great Lakes Region. However, the month began with high temperatures well above normal. High temperatures in the lower to middle 80s were featured on the 1st and 2nd of October. Temperatures averaged about 12.9 °F above normal from the 1st through the 4th.

A cold front pushed through the area on the 4th knocking temperatures to normal levels and a reinforcing cold front moved through on the 6th with scattered very light rain showers pushing temperatures below normal for the 7th and 8th. High temperatures were only in the middle to upper 50s on the 7th. A frost advisory was issued on the 7th for the morning of the 8th as low temperatures in the 30s were expected.

Warmer air moved back into the Western Lower Great Lakes by the 10th as high temperatures moved back into the upper 60s and lower 70s. A powerful cold front with widely scattered rain showers passed through the area on the 13th bringing freezing air from Canada. This prompted a freeze warning for the morning of the 14th. Low temperatures reached the upper 20s to lower 30s by the morning of the 14th.

Temperatures remained below normal through the end of the month, averaging 6.6 °F below normal. Warmer air tried several times to return to the area, but it stayed to the south. Rain events occurred on the 17th through the 19th and again on the 24th and 25th. Both produced an average of around 0.4 inches. There was a trace of snowfall with the second event. A weaker precipitation event occurred on the 29th with only about 0.2 inches of precipitation. However, with this system we had the first measurable snowfall. Warsaw Indiana reported one inch of snow on the 29th (COOP observer).

With no flooding, no flood watches, warnings or statements were issued by WFO IWX for October 2002.

X An X inside this box indicates that no flooding occurred within this Hydrologic Service Area.

General Overview: November 2002 was colder and drier than normal across Northern Indiana, Northwest Ohio and Extreme Southern Michigan. Precipitation was about 1.1 inches below normal. Temperatures averaged about 2.0 °F below normal. (Only NWS Fort Wayne and South Bend data were used).

For the month of November, the average high temperature was in the middle 40s, the average low temperature was in the lower 30s giving an average temperature in the upper 30s. (Only NWS Fort Wayne and South Bend data were used).

There were only three significant rain events across Northern Indiana, Southern Michigan and Northwest Ohio in November 2002. The first one occurred from the 3rd through the 8th and was all rain. Precipitation totals averaged around 0.3 inches (COOP Data). The second event stretched from the 9th through the 11th and was all rain. Precipitation averaged a little more than one inch (COOP Data). The third event occurred from the 20th through the 23rd and was a mixture of rain and snow. This event was the first significant snowfall of the season for much of the area. Precipitation totals averaged around 0.4 inches. Snowfall totals averaged nearly two inches (COOP Data).

The Palmer Drought Severity Index for the period ending December 7th showed some improvement. Southeast Michigan improved to moderate drought from severe. Moderate drought continued over Northwest and North Central Indiana and South Central Michigan. Northeast Indiana. Northeast Indiana was on the dry side of the normal range. Northwest Ohio and Southwest Michigan improved to the dry side of normal from moderate drought in October. The numbers are as follows: Northwest Indiana (-2.84 Moderate Drought), North Central Indiana (-2.73 Moderate Drought), Northeast Indiana (-1.57 Near Normal), Southwest Michigan (-1.63 Near Normal), South Central Michigan (-2.42 Moderate Drought), Southeast Michigan (-2.26 Moderate Drought) and Northwest Ohio (-1.76 Near Normal).

Temperature: For Fort Wayne, the average high temperature in November 2002 was 45.1 °F and the average low temperature was 32.1 °F. This gave an average temperature of 38.5 °F which was 2.1 °F below normal. At South Bend, the average high temperature was 45.0 °F and the average low temperature was 31.2 °F giving an average temperature of 38.1 °F which was 2.0 °F below normal for November. The warmest temperature occurred on the 10th at both Fort Wayne (65 °F) and South Bend (67 °F). The lowest temperature occurred at on the 27th at both Fort Wayne (13 °F) and South Bend (17 °F). No temperature records were set at either Fort Wayne and South Bend.

Precipitation: Precipitation was below normal at both Fort Wayne and South Bend in November 2002. At Fort Wayne 2.27 inches of precipitation fell, 0.71 inches below

normal. At South Bend, 1.91 inches of precipitation fell, 1.48 inches below normal. At Fort Wayne, 3.1 inches of snow fell, 0.1 inches above normal. At South Bend 4.6 inches of snow fell, 3.1 inches below normal.

Weather: November 2002 continued the cold weather pattern of October with the first 6 days having temperatures below normal. Temperatures averaged over 8 °F below normal across the Western Lower Great Lakes region over the first 6 days as Maritime Polar air dominated. High temperatures were in the upper 30s and in the 40s during this time. A weak storm system crossed the region from the 3rd through the 6th dropping about a third of an inch of rain.

The cold airmass retreated and Maritime Tropical air advanced into the region on the 7th. High temperatures rebounded into the 50s and into the 60s on the 8th. The warmest temperatures of the month occurred on the 10th as high temperatures reached into the middle 60s, about 15 °F above normal. Temperatures from the 8th through the 10th averaged about 14 °F above normal.

A vicious cold front swept across the area on the 9th and 10th bringing the heaviest rains of the month to the area with an average of over one inch rainfall. In addition, severe storms broke out across parts of Northeast Indiana and Northwest Ohio. Some of these storms produced tornadoes. A violent tornado swept across parts of Northeast Indiana and Northwest Ohio. This storm did F4 damage to parts Van Wert County including the City of Van Wert in Northwest Ohio.

High temperatures fell into the 50s by the 11th, and into the 40s by the 12th but rebounded into the 50s on the 13th and 14th as warm air returned north. Another re-enforcing shot of cold air moved into the Western Lower Great Lakes behind a cold front on the 15th producing the first measurable snow fall over the southeastern quarter of our forecast area. Fort Wayne measured 0.4 inches on the 15th with another 0.2 inches of snow on the 16th. Other locations in Northeast Indiana reported between a third and one inch of snowfall. High temperatures were pushed into the upper 30s on the 16th and 17th.

High temperatures rebounded into the 40s by the 18th and were back into the 50s by the 19th as warm air moved back north across the Western Lower Great Lakes. Another cold front approached the area on the 19th causing rain showers to breakout across Northern Indiana, Southern Michigan and Northwest Ohio. With cold frontal passage, high temperatures fell back into the 40s on the 21st and into the middle 30s on the 22nd. The first significant snowfall of the season fell across Northern Indiana and Northwest Ohio on the 21st and 22nd. The highest amounts fell over Northeast Indiana and Northwest Ohio with Hartford City in Northeast Indiana reporting 4.7 inches of snowfall by the morning of the 22nd with Defiance Ohio reporting 4.5 inches.

High temperatures moved back into the 40s on the 23rd and 24th before a powerful cold front swept in from the northwest dropping high temperatures into the lower 30s on the 25th. Scattered snow showers fell across the area from the 25th through the 26th with little accumulation. High temperatures remained quite cold through the 28th ranging from the upper 20s to the lower 30s. The coldest temperatures of the month occurred on the 27th at

low temperatures fell into the teens.

One last shot of warm air moved north on the 29th driving high temperatures into the middle to upper 40s. This warmup was short lived as a cold front again dropped high temperatures into the upper 30s to around 40 °F. Light snow accompanied frontal passage, but the most significant snowfall of the month occurred at South Bend with this system as 2.8 inches fell. Fort Wayne received only 0.4 inches of snow by the 30th.

Temperatures from the 11th through the 24th averaged near normal, but from the 25th through the 30th temperatures averaged over 6 °F below normal.

With continued dry soils and below normal rainfall, no flooding occurred across Northern Indiana, Extreme Southern Michigan and Northwest Ohio in November 2002. As a result, no flood warnings, statements or watches were issued by Weather Forecast Office (WFO) Northern Indiana for its Hydrological Service Area (HSA).

NWS FORM E-5

U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH & YEAR):
December 2002

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
January 9, 2003

TO: NATIONAL WEATHER SERVICE (W/OH12X1)
HYDROMETEOROLOGICAL INFO CENTER
1325 EAST-WEST HIGHWAY, RM 7116
SILVER SPRING, MD 20910

SIGNATURE:
Michael Sabones, MIC
Greg Lamberty, Service Hydrologist

When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (WSOM E-41).

An **X** inside this box indicates that no flooding occurred within this Hydrologic Service Area.



General Overview: December 2002 temperatures were near normal, but precipitation was lower than normal across Northern Indiana, Northwest Ohio and Extreme Southern Michigan. Precipitation was about 1.2 inches below normal. Temperatures were around the normal for December. (Only NWS Fort Wayne and South Bend data were used).

For the month of December, the average high temperature was in the middle 30s, the average low temperature was in the lower 20s giving an average temperature in the upper 20s. (Only NWS Fort Wayne and South Bend data were used).

For 2002, temperatures averaged 1.5 °F above normal, while precipitation averaged 7.09 inches below normal for the year. (Only NWS Fort Wayne and South Bend data were used).

There were only two significant precipitation events across Northern Indiana, Southern Michigan and Northwest Ohio in December 2002. The first one stretched from the 17th through the 21st and was mostly rain. Rainfall amounts averaged around 0.9 inches (COOP Data). As a result of the rainfall, significant rises occurred on rivers and streams in Northwest Ohio and Northeast Indiana. Soils in this area are generally harder and more efficient runoff producers than the sandy soils of North-Central and Northeast Indiana and Southern Michigan. The St. Marys River at Decatur rose more than 9 feet from low flow by December 20. The Auglaize River near Fort Jennings in Northwest Ohio rose 6 feet from low flow by December 21. Similar rises were recorded on the Upper Wabash River as well. However, due to the initial low flows in early December, all rivers remained below flood stage. One Hydrologic Statement (RVS) was issued for elevated stream flows on the Wabash River.

The second most significant precipitation event was a snowstorm which occurred on December 24, Christmas Eve and December 25, Christmas Day. Snowfall averaged nearly 7 inches across much of the area (COOP Data). Snow water equivalent totaled just over a half inch in the snowstorm (COOP Data). This snow melted rapidly on the 30th and 31st causing rapid rises on rivers and streams in Northeast Indiana and Northwest Ohio. The

same rivers and streams rose toward flood stage that were affected by the rains of December 17 through December 21. These rises were greater than those which occurred in the first event with the St. Marys River at Decatur rising nearly 12 feet. The St. Marys River crested at 14.52 feet at 3:00 a.m. New Year's Day. A rise of more than 8 feet from melting snow occurred on the Auglaize River near Fort Jennings. The crest reached 9.81 feet on the afternoon of New Year's Day. Again, these rises occurred from low flow as the rivers quickly receded from the Mid-December rains. This prevented any flooding from occurring. Two Hydrologic Statements (RVSs) were issued on the last two days of December for elevated flows along the St. Marys and Wabash Rivers.

The Palmer Drought Severity Index for the period ending December 28, 2002 showed that Northeast Indiana slipped into moderate drought and Southeast Michigan improved to the dry side of normal conditions from moderate drought. There was little change across the rest of the area. As December ended, moderate drought held sway over all of Northern Indiana and South-Central Michigan. The dry side of normal conditions prevailed over Northwest Ohio and Southwest and Southeast Michigan. The numbers are as follows: Northwest Indiana (-2.89, Moderate Drought), North-Central Indiana (-2.80, Moderate Drought), Northeast Indiana (-2.02, Moderate Drought), Southwest Michigan (-1.25, on the Dry side of Normal), South-Central Michigan (-2.17, Moderate Drought), Southeast Michigan (-1.77, Dry side of Normal), Northwest Ohio (-1.92, on the Dry side of Normal)

December closed with very little snow cover left after warm temperatures melted much of the late December snowfall. So the month of December 2002 ended with essentially no snow on the ground across the area.

Temperature: For Fort Wayne, the average high temperature in December 2002 was 35.8 °F and the average low temperature was 21.8 °F. This gave an average temperature of 28.8 °F which was 0.2 °F below normal. At South Bend, the average high temperature was 35.5 °F and the average low temperature was 21.9 °F giving an average temperature of 28.7 °F which was normal for December. The warmest temperature occurred on the 31st at Fort Wayne (54 °F) and on the 30th at South Bend (55 °F). The lowest temperature occurred on the 3rd at both Fort Wayne (5 °F) and South Bend (-1 °F). A record low temperature was set at South Bend on the 4th when the temperature reached 4 °F. No temperature records were set at Fort Wayne in December 2002.

Precipitation: Precipitation was below normal at both Fort Wayne and South Bend in December 2002. At Fort Wayne 1.61 inches of precipitation fell, 1.16 inches below normal. At South Bend, 1.80 inches of precipitation fell, 1.29 inches below normal. At Fort Wayne, 9.4 inches of snow fell, 1.1 inches above normal. At South Bend 9.0 inches of snow fell, 10.2 inches below normal.

Weather: December 2002 continued the cold weather pattern of November with temperatures averaging more than 10 °F below normal over the first nine days. Continental Polar air masses dominated. Light snow fell on the 1st and 3rd leaving a thin coat of snow on the ground over much of Northern Indiana. Snow depths remained in the 2 to 4 inch range over Southern Michigan, Extreme Northern Indiana and the northern part of Northwest Ohio. This snowfall allowed low temperatures to fall into the single digits on

the 3rd and the 4th. The temperature fell below zero at South Bend on the morning of the 3rd and 5 °F was reached at Fort Wayne.

Scattered patches of light snow fell across the area on the 5th and the 6th with little accumulation. These flurries were caused by a weak return of some warmer air. High temperatures rose to around 40 °F on the 7th. The fringe snow pack melted with this warmth, but areas with deeper snow remained covered.

Warmer Maritime Polar air returned to the lower Great Lakes region on the 10th with high temperatures reaching the upper 30s and lower 40s. High temperatures remained in the 30s and lower 40s from the 10th through the 17th. A strong storm system developed to the west driving warmer air over the region on the 17th which moved high temperature into the lower 50s by the 18th. Rain showers overspread the area on the 17th which lingered through the 19th removing any significant snow cover left over from early December. This storm system brought the best precipitation of the month to the area with amounts averaging nearly 0.9 inches (COOP Data).

A cold front passed through on the 20th causing some light snowfall with light accumulations. Some areas in Northeast Indiana received between one and two inches of snow with the system. High temperatures fell into the 30s by the 20th.

High temperatures slowly drifted down into the lower 30s by the 22nd and 23rd. This set the stage for a storm system developing over the Southern Plains to spread snow across the area on Christmas Eve and Christmas Day. An average of nearly 7 inches fell during this time period (COOP Data). Colder air followed the storm on the 26th and 27th lowering high temperatures into the 20s.

A stronger storm system developed to the west driving a tropical type air mass into the lower Great Lakes on the 30th. As a result, high temperatures were pushed into the 50s. This warm moist air mass quickly melted the new snow pack causing rises on area rivers and streams. There was, however, no flooding resulting from it.

With this warm air invasion, there was no snow pack left across the Lower Great Lakes as December 2002 ended.

From the 10th through the end of the month, temperatures averaged nearly 9 °F above normal, so the warmth of the last two thirds of the month offset the very cold first nine days of December leaving the temperature near normal.

Even with rises on area rivers and streams from rain and snow melt, rivers were able to handle the runoff without flooding. Thus December closed with no flooding being reported. As a result, no flood warnings (FLWs) or flood statements (FLSs) were issued by WFO IWX for its Hydrologic Service Area (HSA). Three Hydrologic Statements (RVSS) were issued for elevated, river levels.