NWS FORM E-5 U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH &YEAR):
January, 2003

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
February 11, 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).

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

General Overview: January 2003 was colder and drier than normal across Northern Indiana, Northwest Ohio and Extreme Southern Michigan. Precipitation was about 0.9 inches below normal. Temperatures averaged about 4 ^{o}F below normal. (Only NWS Fort Wayne and South Bend data were used).

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

There were really no significant precipitation events in January 2003 across the Western Lower Great Lakes. The most important precipitation event occurred from January 2nd through January 6th when 0.4 inches of precipitation fell, all of it being in the form of snow (COOP Data). Snowfall accumulation averaged around 6 inches over this 5 day period (COOP Data).

There was a mild interlude on the 8th and 9th where temperature rose into the low to mid 40s. Most of the snow that fell from the 2nd through the 6th melted causing rises on area rivers and streams, but none of the river levels even approached flood stage. The St. Marys River in Northwest Ohio and Northeast Indiana reacted the most recording a rise of over 4 feet at Decatur Indiana on the 10th. However this rise failed to push the water level close to the 17 foot flood stage.

Lake effect snow events occurred over Northwest Indiana and Southwest Lower Michigan on the 10th, 14th, the 17th and 18th, the 22nd and 23rd and the 26th. All but the 22nd and 23rd had snowfall totals between 2 and 8 inches.

The most significant snowfall occurred with the 22nd and 23rd event with locations in Laporte County in Northwest Indiana and in Cass County Michigan reporting a foot of snow.
The month closed out with a snow event on the 29th which produced a range from one to five inches of snowfall with the highest amounts over Northeast Indiana and Northwest

Ohio.

The Palmer Drought Severity Index for the period ending February 1, 2003 showed that Northwest and North-Central Indiana slipped into severe drought. Southeast Michigan and Northwest Ohio fell into moderate drought. Only Southwest Michigan was on the dry side of normal soil moisture. As January ended, severe drought held sway over Northwest and North-Central Indiana. Moderate drought afflicted South-Central and Southeast Michigan as well as Northwest Ohio and Northeast Indiana. Southwest Michigan was the only area on the dry side of normal. The numbers are as follows: Northwest Indiana (-3.23, Severe Drought), North-Central Indiana (-3.22, Severe Drought), Northeast Indiana (-2.60, Moderate Drought), Southwest Michigan (-1.44, on the Dry side of Normal), South-Central Michigan (-2.71, Moderate Drought), Southeast Michigan (-2.68, Moderate Drought), and Northwest Ohio (-2.60, Moderate Drought).

January ended with a snowpack ranging from 2 to 8 inches with the deepest snow cover in the lake effect snow areas around Lake Michigan in Northwest Indiana and Southwest Lower Michigan. Snow water equivalents are estimated in a range from a quarter to three quarters of an inch.

River and stream flows were below normal as the month ended as well. All of the early January snowmelt rises were over by mid January.

Temperature: For Fort Wayne, the average high temperature in January 2003 was 25.9 ^{o}F and the average low temperature was 11.0 ^{o}F. This gave an average temperature of 18.4 ^{o}F which was 5.2 ^{o}F below normal. At South Bend, the average high temperature was 26.8 ^{o}F and the average low temperature was 13.8^{o}F giving an average temperature of 20.3 ^{o}F which was 3.1 ^{o}F below normal for January. The warmest temperature occurred on the 8th at both Fort Wayne (45 ^{o}F) and South Bend (44 ^{o}F). The lowest temperature occurred on the 27th at both Fort Wayne(-9 ^{o}F) and South Bend (0 ^{o}F). No extreme temperature records were set or tied in January, 2003..

Precipitation: Precipitation was below normal at both Fort Wayne and South Bend in January 2003. At Fort Wayne 1.30 inches of precipitation fell, 0.75 inches below normal. At South Bend, 1.21 inches of precipitation fell, 1.06 inches below normal. At Fort Wayne, 17.8 inches of snow fell, 7.9 inches above normal. At South Bend 27.2 inches of snow fell, 4.0 inches above normal.

Weather: January 2003 started out with temperatures running above normal for the first 10 days. Temperatures averaged 3.9 ^{o}F above normal through the 10th. Snow fell as a series of weak weather disturbances crossed the area from the 2nd through the 6th. An average total of 6 inches fell across the area during this time. Continental Polar air retreated north for two days, the 8th and 9th as high temperatures rose into the lower 40s. Much of the 6 inch snowfall melted resulting in rises on area rivers and streams. None of these rises approached flood stage in any area.
The first in a series of arctic air masses moved into the area from Southern Canada on the 10th bringing lake effect snow to Northwest Indiana and Southwest Lower Michigan. High temperatures were driven down into lower 20s and upper teens by the 11th. This blast of

arctic air continued to be re-enforced by more arctic air masses over the last 21 days of the month. Temperatures averaged about 7.6 ^{o}F below normal from the 11th through the 31st.

With each blast of arctic air there was the threat of lake effect snow. Lake effect events occurred on the 14th, the 17th and 18th, the 22nd and 23rd and the 26th. All but the 22nd and 23rd had snowfall totals between 2 and 8 inches for each event. The 22nd anb 23rd lake effect snow event had reports of one foot of snowfall over parts of Northwest Indiana and Southwest Lower Michigan. Low temperatures fell to a range of 6 above to 9 below zero on the 27th, 29th and 30th. A storm system moved through the area on the 28th allowing enough warmer air to advance into the Western Lower Great Lakes. Snow overspread the area in the 28th and early 29th producing between one and five inches of snow with the heaviest snowfall occurring over the southeast quarter of our HSA.

January, 2003 closed with a warmup. High temperatures rose into the 30s across the area promising more snow melt. A Hydrologic Statement (RVS) was written to cover the threat of high water on the in the Upper Wabash and St. Marys Rivers.

Only two Hydrologic Statements (RVSs) were issued in January to cover the threat of high river flows, one on the 1st and the other on the 31st. There was no flooding in January 2003. As a result, no flood warnings (FLWs) or flood statements (FLSs) were issued by WFO IWX for its Hydrologic Service Area (HSA). Daily Hydrologic Summary and River and Lake Summary reports were issued as usual.

NWS FORM E-5 U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH &YEAR):
February, 2003

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
March 4, 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).

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

General Overview: February 2003 was colder and drier than normal across Northern Indiana, Northwest Ohio and Extreme Southern Michigan. Precipitation was about 0.8 inches below normal. Temperatures averaged about 4.4 ^{o}F below normal. (Only NWS Fort Wayne and South Bend data were used).

For the month of February, the average high temperature was around 30 ^{o}F , the average low temperature was in the middle teens giving an average temperature in the lower 20s. (Only NWS Fort Wayne and South Bend data were used).

There were just two significant precipitation events in February 2003 across the Western Lower Great Lakes. The most important precipitation event extended from February22nd through February 25th which produced around a half inch of precipitation. Much of the precipitation fell as a mixture of rain and snow across parts of Northeast Indiana and Northwest Ohio. There were significant snow accumulations with this event, however as Hartford City reported a total of 12 inches (COOP Data). Other areas received considerably less snow with snowfall averaging around 5 inches across the entire area (COOP Data). Snowfall totals ranged from 2 inches in Northwest Indiana to a foot in Northeast Indiana. Locations in Northwest Ohio reported over an inch of water equivalent in the mixed snow and rain (COOP Data). The second significant event occurred from February 1st through February 5th which produced an average of a third of an inch of precipitation. Most of the precipitation fell as rain. Only an average of 0.7 inches of snow fell, all on the 4th and 5th (COOP Data).

February started with a snowpack of one to five inches with the highest amounts over Northeast Indiana and Northwest Ohio. Temperatures warmed into the mid to upper 40s on the 3rd which melted most of the snow. Melting snow and light rainfall allowed rivers, especially in Northeast Indiana to rise. The St. Marys River at Decatur rose nearly 7.5 feet to crest at 10.5 feet on February 4th. The Wabash at Linn Grove rose 4 feet from 3.7 to a 7.7 foot crest on the 5th. Rises on other rivers were less with rivers in Northwest Indiana rising around a half foot in this event. Five Hydrologic Statements were issued for expected high water flows on the Wabash, St Marys, Maumee and Tippecanoe Rivers in

response to the rainfall and snowmelt.

The February 22nd through February 25th event caused some minor rises on area rivers and streams, with the rivers in Northeast Indiana showing the greatest rises, however no river or stream even approached flood stage. February began with rivers and streams in low flow. Thus river channels had more than enough extra volume to carry any increased volume from runoff generated by snowmelt and/or rain fall. Precipitation continued to be below normal in February further reducing the flood threat. The ground was, however, frozen to over 2 feet in places as a result of the sparse snowpack and the very cold weather of January and February. Frozen ground increases the flood potential in any rain/snowmelt event.

The precipitation event of February 22nd to February 25th was followed by an arctic cold snap which prevented any significant snowmelt. The month ended with snow depths ranging from a trace over Northwest Indiana to 8 inches over parts of Northeast Indiana and Northwest Ohio. Snow water equivalent ranged from a trace over parts of Northwest Indiana to around one inch over parts of Northeast Indiana and Northwest Ohio.

The Palmer Drought Severity Index for the period ending February 22, 2003 showed that Northwest and North-Central Indiana remained in severe drought. Southeast and South-Central Michigan, Northwest Ohio and Northeast Indiana were in moderate drought. Only Southwest Michigan was on the dry side of normal in soil moisture. The numbers are as follows: Northwest Indiana (-3.26, Severe Drought), North-Central Indiana (-3.18, Severe Drought), Northeast Indiana (-2.61, Moderate Drought), Southwest Michigan (-1.46, on the Dry side of Normal), South-Central Michigan (-2.66, Moderate Drought), Southeast Michigan (-2.51, Moderate Drought), and Northwest Ohio (-2.29, Moderate Drought).

River and stream flows were well below normal and some rivers in Northwest Indiana plunged toward record low flows as February ended.

Temperature: For Fort Wayne, the average high temperature in February 2003 was 30.1 ^{o}F and the average low temperature was 15.2 ^{o}F. This gave an average temperature of 22.7 ^{o}F which was 4.6 ^{o}F below normal. At South Bend, the average high temperature was 30.4 ^{o}F and the average low temperature was 15.8^{o}F giving an average temperature of 23.1 ^{o}F which was 4.2 ^{o}F below normal for February. The warmest temperature occurred on the 3rd at both Fort Wayne (49 ^{o}F) and South Bend (47 ^{o}F). The lowest temperature occurred on the 25th at both Fort Wayne(-5 ^{o}F) and South Bend (2 ^{o}F). A low temperature record was set at Fort Wayne on the 25th when the mercury fell to -5 ^{o}F. No temperature records were set at South Bend in February 2003. February 2003 was the 12th coldest at South Bend and the 13th coldest at Fort Wayne on record.

Precipitation: Precipitation was below normal at both Fort Wayne and South Bend in February 2003. At Fort Wayne 1.39 inches of precipitation fell, 0.55 inches below normal. At South Bend, 0.91 inches of precipitation fell, 1.07 inches below normal. At Fort Wayne, 14.3 inches of snow fell, 6.7 inches above normal. At South Bend 14.5 inches of snow fell, 1 inch below normal. February 2003 was the 5th snowiest at Fort Wayne and the 7th driest at South Bend on record.

Weather: February 2003 started out with temperatures running above normal for the first 4 days. Temperatures averaged 9.4 ^{o}F above normal through the 4th with highs reaching the upper 40s on the 3rd (Only NWS Fort Wayne and South Bend data were used). A mostly rain event occurred in this time frame which melted any remaining snowpack from late January. Snowmelt and rainfall caused rises on area rivers and streams. All remained below flood stage. A cold front passed through the area on the 4th changing any remaining precipitation to snow. The precipitation ended on the 5th with an average of 0.7 inches of snowfall across the area (COOP Data). High temperatures were driven back into mid 20s on the 5th and remained in the 20s and 30s through 18th. Several storm systems brought snow to the area on the 9th through the 11th, the 14th into the 15th and then the 16th into the 18th. Snowfall amounts averaged about 2 inches for each event. There were some 5 and 6 inch reports across our southern counties from the storm on the 15th. Two to three inch amounts were reported across the southeast corner of Northeast Indiana and Northwest Ohio from the storm system on the 16th through the 18th. The snow that fell with these storm was a dry snow. Temperatures averaged about 6 ^{o}F below normal (Only NWS Fort Wayne and South Bend data were used).

The grip of arctic air loosened on the 19th as high temperatures rose into the mid to upper 30s. The warmup continued into the 20th as high temperatures catapulted into the lower to middle 40s which melted the some of the snow that accumulated from the 5th through the 18th. There was little response in river and stream levels from that warm spell. Temperatures averaged about 2.8 ^{o}F above normal from the 19th through the 22nd (Only NWS Fort Wayne and South Bend data were used).

The cold was plotting a return as a gathering storm developing over the Southern Plains swept east on the 22nd. This storm brought heavy snow to much of Northern Indiana and Northwest Ohio. The snow was preceded by rain over Northeast Indiana and Northwest Ohio. However the big story was the snow which piled high over parts of Northeast Indiana and southern parts of Northwest Ohio. Hartford City reported a total of a foot of snow on the 22nd into the 23rd. Very cold air quickly followed driving high temperatures into the middle teens by the 25th. Fort Wayne had the coldest February 25th on record as the temperature fell to -5 ^{o}F. Temperatures averaged over 22 ^{o}F below normal on that day. The core of the arctic air mass slowly moved east allowing a warmup as high temperatures rose into the 30s by the 28th. Temperatures averaged 13.4 ^{o}F below normal for the last 6 days of February (Only NWS Fort Wayne and South Bend data were used).

Only five Hydrologic Statements (RVSs) were issued in February to cover the threat of high river flows, from the 1st through the 5th. There was no flooding in February 2003. As a result, no flood warnings (FLWs or FFWs) or flood statements (FLSs or FFSs) were issued by WFO IWX for its Hydrologic Service Area (HSA). Daily Hydrologic Summary and River and Lake Summary reports were issued as usual.

NWS FORM E-5 U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH &YEAR):
March, 2003

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
April 13, 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: March 2003 was drier than normal with near normal temperatures over Northern Indiana, Northwest Ohio and Extreme Southern Michigan. Precipitation was about 0.9 inches below normal. Temperatures averaged about 0.1 ^{o}F below normal. (Only NWS Fort Wayne and South Bend data were used).

For the month of March, the average high temperature was in the upper 40s, the average low temperature was in the upper 20s giving an average temperature in the upper 30s. (Only NWS Fort Wayne and South Bend data were used).

There were three significant precipitation events in March 2003 across the Western Lower Great Lakes. The biggest precipitation event occurred on March 28th through the 29th. The second largest precipitation event occurred on March 19th through the 21st. The third largest event occurred on March 12th through the 14th . The first event was an all rain event and caused most of the flooding. The second and third events were, a mostly rain with a little snow mixed in, events. There was some urban street flooding on the evening of March 20th in the Fort Wayne Metropolitan area.

The event of March 12th through the 14th produced an average of 0.4 inches of precipitation (COOP Data). This combined with snowmelt and frozen soils led to the first flooding of the year. The first flood occurred on the Salamonie River near Warren Indiana when an ice jam forced the river to go over 1.5 feet above the 12 foot flood stage on the evening of the 12th of March . The event lasted only about 4 hours and there was no damage with the flooding. Roads near the river gauge flooded, but only for a short time. The ice jamming was caused by melting snow and some rain as temperatures rose into the upper 40s that afternoon. Rainfall and snowmelt from that event also led to minor flooding along the St Marys River near Decatur. Flooding began on the evening of the 13th and continued through the early afternoon of the 16th. Flooding was minor in nature and no damage was reported. The St. Marys crested at 17.5 feet, just a half foot above the 17 foot flood stage. Another ice jam developed on the evening of the 15th but this time it was on the Maumee downstream of Napoleon Ohio. Rainfall and melting snow forced the ice on the Maumee to rise and jam. This jam lasted over several days, beginning sometime on the

12th as mild temperatures began melting snow and ice near the river. The river rose above the 12 foot flood stage sometime on the 15th and remained above flood stage through the afternoon of the 16th. The crest was at 14.5 feet on the evening of the 15th. There was some minor flooding along the Wabash River near Wabash Indiana and on the Tiffin River near Stryker Ohio on the 16th. Again this flooding was caused by melting snow and the rains of the 12th through the 14th. Rivers began receding and all were back within their banks by the 23rd.

The second event occurred from March 19th through the 21st and produced an average of around a half inch of mostly rainfall (COOP Data). An average of only 0.2 inches of snow fell with this event (COOP Data). There was some urban street flooding in Fort Wayne as a result of this event.

The heaviest rainfall occurred on March 28th through the 29th as an average of almost two thirds of an inch of rain (COOP Data) fell across the area. Surprisingly there was no flooding as a result of the rainfall.

One of the reasons for the lack of flooding with the second and third events was that the long term drought that gripped the area since last summer severely depleted soil moisture. Another factor was that the mild weather which began on the 12th thawed the frozen soil.

The Palmer Drought Severity Index for the period ending April 5, 2003 showed that recent rains had improved the drought situation over Northern Indiana, Northwest Ohio and Southern Michigan. Only Northwest and North Central Indiana were in moderate drought. All of Southern Michigan, Northwest Ohio and Northeast Indiana were near normal in long term soil moisture. The numbers are as follows: Northwest Indiana (-2.79, Moderate Drought), North-Central Indiana (-2.48, Moderate Drought), Northeast Indiana (-1.13, Dry side of Normal), Southwest Michigan (+0.13, Normal) South-Central Michigan (-0.29, Normal), Southeast Michigan (-0.72, Dry Side of Normal), and Northwest Ohio (-1.12, Dry Side of Normal).

Temperature: For Fort Wayne, the average high temperature in March 2003 was 48.1 ^{o}F and the average low temperature was 27.0 ^{o}F. This gave an average temperature of 37.6 ^{o}F which was 0.5 ^{o}F below normal. At South Bend, the average high temperature was 47.9 ^{o}F and the average low temperature was 27.9 ^{o}F giving an average temperature of 37.9 ^{o}F which was 0.4 ^{o}F above normal for March. The warmest temperature occurred on the 24th at both Fort Wayne (72 ^{o}F) and South Bend (75 ^{o}F). The lowest temperature occurred on the 3rd at both Fort Wayne(2 ^{o}F) and South Bend (4 ^{o}F). Several temperature records were set in March 2003. In South Bend, a record high temperature of 72 ^{o}F was set on March 17th. Record low maximum temperatures of 21 ^{o}F was set on the 9th and 22 ^{o}F was set on the 10th at South Bend. At Fort Wayne, a record high temperature of 71 ^{o}F was set on the 17th of March.

Precipitation: Precipitation was below normal at both Fort Wayne and South Bend in March 2003. At Fort Wayne 2.43 inches of precipitation fell, 0.43 inches below normal. At South Bend, 1.52 inches of precipitation fell, 1.37 inches below normal. At Fort Wayne, 2.1 inches of snow fell, 2.6 inches below normal. At South Bend 3.8 inches of snow fell,

4.9 inches below normal. The single day precipitation record for March 28th was broken at Fort Wayne when 1.42 inches of rain fell.

Weather: March 2003 began with temperatures well below normal. Over the first 11 days, temperatures averaged over 10 °F below normal. High temperatures were in the 20s and 30s with only the 8th having temperatures in the 40s. Several light snow events occurred from the 1st through the 11th with the highest amounts averaging around 2 inches (COOP Data) that fell from the 4th through the 6th. Snow depths ranged from a trace to 6 inches at that time with the highest snow amounts found over Northwest Ohio and Northeast Indiana (COOP Data). Snow water equivalents were estimated to be from 0.2 inches to an isolated one inch amount over the far southern section of Northeast Indiana and Northwest Ohio. This snowpack was a factor in March flooding which occurred in those locations later in March.

From the 12th through 28th, the weather warmed. Temperatures averaged over 8.5 °F above normal during this time period. All three significant precipitation events occurred between the 12th and 28th. The first event ushered in the first flooding of the season. Temperatures rose into the upper 40s on the 12th which began the snowmelt process. Runoff from the snowmelt was one large factor in the flood event. The other was moderate rainfall that occurred on the 13th and 14th. Both factors combined to cause minor flooding along the Wabash, Tiffin and St. Marys Rivers in Northeast Indiana and Northwest Ohio. There were two ice jam flood events with the first one occurring on the evening of the 12th on the Salamonie River and the second on the 16th on the Maumee River. Mild temperatures caused ice on both the Salamonie River near Warren Indiana and the Maumee River downstream of Napoleon Ohio to begin moving. This led to the ice jam flooding on both rivers. There was an ice jam on the Blanchard River upstream from Ottawa that occurred on the 6th, but the river crested over 5 feet below flood stage.

High temperatures continued to rise reaching the lower 70s by the 17th. A weak cold front then passed through the area producing just some cloud cover. High temperatures fell into the lower 60s on the 18th and retreated into the middle 40s by the 22nd. High temperatures rebounded into the upper 60s by the 28th as warm air streamed into the area ahead of the next storm system.

The most significant precipitation event occurred on the 28th and 29th of the month, however it did not result in any flooding. High temperatures retreated into the upper 30s by the 29th as cold air spilled in from the north behind the storm system. Temperatures averaged 8.5 °F below normal over the last 3 days of March.

For March, 25 Hydrologic Statements (RVSs) were issued to disseminate river forecasts and alert people to the threat of ice jams. 5 Flood Warnings (FLWs) and 21 Flood Statements (FLSs) were also issued to cover river flooding as well as urban street flooding in WFO IWX's Hydrologic Service Area. Daily River and Lake Summaries (RVDs) and Hydrologic Summaries (RVAs) were issued as well. Snowmelt flood potential for the entire area and AHPS probablistic stage and flow forecasts for the Kankakee River Basin were disseminated in March using 4 Hydrologic Outlooks (ESFs).

NWS FORM E-5 U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH &YEAR):
April, 2003

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
May 7, 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: April 2003 was warmer and drier than normal over Northern Indiana, Northwest Ohio and Extreme Southern Michigan. Precipitation was about three quarters of an inch below normal. Temperatures averaged about 1.5 ^{o}F above normal. (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 upper 30s giving an average temperature around 50 ^{o}F. (Only NWS Fort Wayne and South Bend data were used).

There were three significant precipitation events in April 2003 across the Western Lower Great Lakes. The most significant event occurred from April 3 through April 5 when an average of over one and a half inches of rain fell (COOP Data). This rain fall caused significant rises on area rivers with some minor flooding occurring along the Tiffin River in Northwest Ohio. The St. Marys at Decatur crested just below flood stage. The St. Joseph River (Ohio) and the Kankakee River had rises to near flood stage. There was no damage reported to our office with this flooding. Four flood warnings (FLWs) and 12 flood statements (FLSs) were issued to cover the flood threat. The Tiffin River receded back into its banks by April 9.

The second most significant precipitation event occurred from April 28 through May 1 when a basin average of nearly 0.7 inches of rain fell (COOP Data). No flooding occurred with this event. Prior to this rain, rivers and streams fell to record and near record low flows for that time of year. The lowest flows occurred from the 27th through the 30th.

The third most significant event occurred from April 6 through April 8 when a little more than 0.4 inches of precipitation fell across the area (COOP Data). This event caused no flooding on its own, but snow fell across extreme Northern Indiana and Southern Michigan with an average amount of about one inch (COOP Data).

The Palmer Drought Severity Index for the period ending May 3, 3002 showed that parts of the area slipped into severe drought. April finished with below normal precipitation which

contributed to drought conditions. South Bend now has 11 straight months of below normal precipitation. Severe drought gripped Northwest and North Central Indiana. Moderate drought was found over Northeast Indiana and Northwest Ohio, while Southern Michigan was on the dry side of normal. The numbers are as follows: Northwest Indiana (-3.40, Severe Drought), North-Central Indiana (-3.51, Severe Drought), Northeast Indiana (-2.28 Moderate Drought), Southwest Michigan (-0.77, Dry Side of Normal) South-Central Michigan (-1.19, Dry Side of Normal), Southeast Michigan (-1.62, Dry Side of Normal), and Northwest Ohio (-2.05, Moderate Drought).

Temperature: For Fort Wayne, the average high temperature in April 2003 was 62.1 ^{o}F and the average low temperature was 37.9 ^{o}F. This gave an average temperature of 50.0 ^{o}F which was 1.0 ^{o}F above normal. At South Bend, the average high temperature was 62.4 ^{o}F and the average low temperature was 38.3 ^{o}F giving an average temperature of 50.3 ^{o}F which was 2.0 ^{o}F above normal for April. The warmest temperature occurred on the 15th at both Fort Wayne (82 ^{o}F) and South Bend (85 ^{o}F). The lowest temperature occurred on the 23rd at Fort Wayne(26 ^{o}F) and on the 5th and 6th at South Bend (24 ^{o}F). April 7 at Fort Wayne recorded the lowest high temperature on record for the date (36 ^{o}F). South Bend had a record high temperature on the 14th when the thermometer measured a high of 81 ^{o}F.

Precipitation: Precipitation was below normal at both Fort Wayne and South Bend in April 2003. At Fort Wayne 2.35 inches of precipitation fell, 1.19 inches below normal. At South Bend, 3.30 inches of precipitation fell, 0.32 inches below normal. At Fort Wayne, a trace of snow fell, 1.1 inches below normal. At South Bend 1.0 inches of snow fell, 0.7 inches below normal. The single day precipitation record for April 4 was broken at both Fort Wayne (1.60 inches) and at South Bend (1.89 inches).

Weather: April 2003 began with temperatures well above normal. Over the first 4 days, temperatures averaged 13 ^{o}F above normal. High temperatures were in the middle to upper 70s. A Maritime Tropical airmass dominated the area's weather. By the 4th, a cold front moved through the Western Lower Great Lakes dropping an average of over one and a half inches of rain (COOP Data). This rainfall cause some minor flooding along the Tiffin River in Northwest Ohio by the 5th of the month. There were significant rises on other rivers in Northeast Indiana and Northwest Ohio.

A cold snap followed the cold front ushering Maritime Polar air into the region. High temperatures fell into lower 50s and the 40s by the 4th. A reinforcing shot of cold air followed a storm system that passed by to the south. This storm brought light snow to far Northern Indiana and Southern Michigan and dropped high temperatures into the 30s by the 6th. South Bend recorded a high of only 33 ^{o}F on the 7th. Temperatures then began a rebound reaching the 60s by the 10th. Temperatures from the 5th through the 13th averaged 7 ^{o}F below normal.

Continental Tropical Air overspread the Western Lower Great Lakes by the 14th as a dry warm front moved through the area. High temperatures rose into upper 70s and lower 80s by the 14th. The warmest temperatures of the month were recorded on the 15th as high temperatures reached the middle 80s at South Bend. A weak cold front pushed through the area on the 16th pushing high temperatures back into the 40s and 50s by the 17th. The

Maritime Polar airmass was quickly replaced by a Maritime Tropical airmass on the 18th as high temperatures shot back into the 80s on the 19th. Above normal temperature continued through the 20th as highs fell into the upper 60s to the middle 70s. Temperatures averaged 10.5 °F above normal from the 14th through the 20th.

Another cold front passed through the area on the 19th and 20th bringing light rain to the region. The rain event finally ended by the 22nd producing just an average of a little less than a quarter of an inch (COOP Data). Maritime Polar air overspread the Western Lower Great Lakes and dropped high temperatures into a range from the upper 40s to the lower 50s by the 22nd before rising back into the lower 70s by the 27th. Temperatures averaged 4.4 °F below normal from the 21st through the 27th.

Warm air returned to the region behind another warm front on the 27th. High temperatures rose into the 70s and stayed there for the rest of April. A storm system approached the area on the 30th spreading rain across the region. An average of just under 0.7 inches (COOP Data) fell from the 28 through May 1. Temperatures averaged 11.3 °F above normal for the last three days of April.

For April, 14 Hydrologic Statements (RVSs) were issued to disseminate river forecasts alerting people to the threat of flooding. Four Flood Warnings (FLWs) and 12 Flood Statements (FLSs) were also issued to cover river flooding in WFO IWX's Hydrologic Service Area over the first 9 days of April. Daily River and Lake Summaries (RVDs) and Hydrologic Summaries (RVAs) were issued as well. A Hydrologic Outlook (ESF) was issued on April 25 to keep the public updated on the drought situation. Another Hydrologic Outlook (ESF) was issued on April 25 to disseminate the tabular form of the probablistic river flood guidance for the Kankakee River Basin that is located in Northwest Indiana.

NWS FORM E-5 U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH &YEAR):
May, 2003

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
June 5, 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: May 2003 was cooler and wetter than normal over Northern Indiana, Northwest Ohio and Extreme Southern Michigan. Precipitation was about three inches above normal. Temperatures averaged about 3.3 ^{o}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 mid 60s, the average low temperature was in the mid 40s giving an average temperature in the mid 50s. (Only NWS Fort Wayne and South Bend data were used).

There were three significant precipitation events in May 2003 across the Western Lower Great Lakes. The most significant event occurred from May 7 through May 12 when an average of almost three inches of rain fell (COOP Data). This rainfall cause flooding along many rivers in Northern Indiana and Northwest Ohio. There was no river flooding in extreme Southern Michigan in May 2003. The second most significant rain event occurred on the 4th and 5th when an average of over one and a half inches fell (COOP Data). The third most significant rain event occurred from April 30th through May 2nd when just over one inch of rain fell (COOP Data).

River levels rose little in response to the April 30 - May 2 event. The area was suffering from moderate to severe drought which served to absorb the rainfall. As a result, there was no flooding reported.

The May 4 - 5 event cause significant rises on rivers and streams in Northeast Indiana and Northwest Ohio. St. Marys at Decatur and Warren on the Salamonie crested just below flood stage on the 6th of the month. The St. Joseph Ohio, the Maumee and Kankakee Rivers also showed significant rises. There was some minor short term flooding over parts of Northeast Indiana and most of Northwest Ohio. The Spy Run Creek in Fort Wayne went above flood stage on the morning of the 5th. A Flood Statement (FLS) was issued alerting people of the flood threat over 10 counties in Northwest Ohio and Northeast Indiana. The ground was becoming more moist and by the 7th, the most significant rainfall overspread the area. With increased soil moisture, flooding began along rivers in Northern

Indiana and Northwest Ohio. All of the events were in the minor flood category with the exception of the St. Marys at Decatur Indiana where moderate flooding occurred. Flooding occurred along the Maumee, St. Joseph River (Ohio), the Tiffin, the Blanchard, the Auglaize, the Eel, the Wabash, the Little, the Salamonie and Spy Run Creek in Fort Wayne. Five Flood Statements (FLSs) were issued for local flooding of streets and creeks for a total of 15 counties in Northeast Indiana, Northwest Ohio and Extreme Southern Michigan on the morning of the 9th. Another Flood Statement (FLS) was issued early on the morning of the 10th for 19 counties in Northern Indiana and Northwest Ohio for more street and small stream flooding. Another Flood Statement (FLS) was issued for local flooding of creeks and streams in extreme South Central Michigan on the morning of the 9th..

There was fear of more flooding rains later on the 10th so a flood watch was issued on the 9th effective to the evening of the 10th for 19 counties in Northern Indiana and Northwest Ohio. The flood watch was extended on the evening of the 9th to include all 37 counties in the Northern Indiana's HSA and the time limit was extended into the morning of the 11th. The additional flooding rains never came so the flood watch was allowed to expire.

No more significant rains fell in May 2003 and all rivers and streams receded below flood stage by May 15.

The Palmer Drought Severity Index for the period ending May 31, 3002 showed that all but Northwest Indiana returned to near normal soil moisture. Northwest Indiana continued to be in a moderate drought. The numbers are as follows: Northwest Indiana (-2.63, Moderate Drought), North-Central Indiana (-1.52, Dry Side of Normal), Northeast Indiana (+0.01, Normal), Southwest Michigan (+0.40, Normal) South-Central Michigan (-0.98, Dry Side of Normal), Southeast Michigan (-1.50, Dry Side of Normal), and Northwest Ohio (+0.08, Normal).

Temperature: For Fort Wayne, the average high temperature in May 2003 was 67.4 ^{o}F and the average low temperature was 47.6 ^{o}F. This gave an average temperature of 57.5 ^{o}F which was 2.9 ^{o}F below normal. At South Bend, the average high temperature was 66.0 ^{o}F and the average low temperature was 45.9 ^{o}F giving an average temperature of 56.0 ^{o}F which was 3.6 ^{o}F below normal for May. The warmest temperature occurred on the 9th at both Fort Wayne (81 ^{o}F) and South Bend (79 ^{o}F). The lowest temperature occurred on the 4th at Fort Wayne(35 ^{o}F) and on the 2nd and 3rd at South Bend (37 ^{o}F).

Precipitation: Precipitation was above normal at both Fort Wayne and South Bend in May 2003. At Fort Wayne 6.94 inches of rain fell, 3.19 inches above normal. At South Bend, 6.34 inches of rain fell, 2.84 inches above normal. Several rainfall records fell in May 2003. At South Bend 0.86 inches of rain fell on May 5 which was the largest amount of rain ever recorded for that date. At Fort Wayne 1.82 inches of rain fell on May 5 which was also a record. Another rainfall record fell on May 9 at Fort Wayne when 1.51 inches of rain May 2003 was the 5th wettest May on record at both Fort Wayne and South Bend.

Weather: May 2003 began with temperatures above normal. That trend lasted only one day as a cold front moved through the area. An average of over one inch of rain fell across

the area from April 30 through May 2 (COOP Data). No flooding occurred with this event. High temperatures quickly fell from highs in the upper 60s to mid 70s into the upper 50s an lower 60s through the 4th. Temperatures averaged around 5 °F below normal from the 2nd through the 4th.

Another storm system approached from the west on the 4th spreading more rain over the Western Lower Great Lakes. This system dropped over one and a half inches of rain across Northern Indiana, Northwest Ohio and Southern Michigan (COOP Data). Some flooding occurred with this event. Warm air streamed into the area with this system. Temperatures rose back into the 70s by the 5th and 6th and with a retrenchment back into the 60s on the 8th, reached the upper 70s to lower 80s by the 9th. Temperatures averaged 5.6 °F above normal from the 5th through the 11th.

Another storm system brought more rain to the area by the 7th and ultimately colder weather filtered into the region by the 12th as high temperatures fell into the 55 °F to 60 °F range. High temperatures stayed in the 50s and 60s through the 16th. . This system was very moist bringing an average of nearly three inches of rain (COOP Data) to the area from the 7th through the 12th. There was flooding across parts of Northern Indiana and much of Northwest Ohio in reaction to the heavy rainfall. Temperatures averaged 6.4 °F below normal from the 12th through the 16th.

There was a brief warm spell from the 17th through the 19th as high temperatures rose back into the upper 60s to lower 70s. The warm air was ushered in behind a weak storm system which dropped an average of around a half inch of rain on the 14th and 15th (COOP Data). Temperatures averaged 2.5 °F above normal from the 17th through the 19th.

Cooler weather returned to the area on the 20th and stayed for the rest of May. High temperatures ranged from the lower to mid 60s through the 25th and slowly rose into the upper 60s to lower 70s by the 26th. A weak storm system crossed the area on the 21st bringing an average of just around a third of an inch to the area. This storm system brought the initial cool air mass to the region. Another storm system produced around a tenth of an inch of rain from the 27th through the 29th. High temperatures then fell back into the upper 50s at South Bend while Fort Wayne remained in the lower 70s. A third storm system crossed the area on the 30th and 31st producing an average of a little more than four tenths of an inch. High temperatures fell into the 50s and 60s on the 31st. Temperatures averaged
8.3 °F below normal from the 20th through the 31st.

For May, 25 Hydrologic Statements (RVSs) were issued to disseminate river forecasts alerting people to the threat of flooding. Nineteen Flood Warnings (FLWs) and 41 Flood Statements (FLSs) were also issued to cover river flooding in WFO IWX's Hydrologic Service Area in May 2003. Seven Flood Statements (FLSs) were issued for creek and street flooding events in May. Three Flood Watch Statements (FFAs) were issued along with one Flood Statement (FLS) to alert the public to the possibility of more flooding. Five Daily River and Lake Summaries (RVDs) were also issued as updates to alert the public about on going flooding. Daily River and Lake Summaries and Hydrologic Summaries (RVAs) were also issued on a daily basis as well. A Hydrologic Outlook (ESF) was issued

on May 21 disseminate the tabular form of the probablistic river flood guidance for the Kankakee River Basin that is located in Northwest Indiana produced by AHPS.

The main damage caused by the May flooding was road closures and crop damage. Two homes were flooded to the first floor in Putnam County Ohio and a business was flooded in Van Wert County Ohio. Basement flooding occurred in Huntington County and a trailer home had water in Allen County both in Indiana. A roof collapsed in Adams County Indiana from heavy rainfall. A trailer park was flooded in Wabash County Indiana but no 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):
June, 2003

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
July 3, 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: June 2003 was cooler and drier than normal over Northern Indiana, Northwest Ohio and Extreme Southern Michigan. Precipitation was about 1.70 inches below normal. Temperatures averaged about 3.3 ^{o}F below normal. (Only NWS Fort Wayne and South Bend data were used).

For the month of June, the average high temperature was in the upper 70s, the average low temperature was in the mid 50s giving an average temperature in the mid 60s. (Only NWS Fort Wayne and South Bend data were used).

There were two significant precipitation events in June 2003 across the Western Lower Great Lakes. The most significant event occurred from June 11 through June 14 when an average of almost one and a quarter inches of rain fell (COOP Data). This rainfall caused some minor flooding along the St. Marys and Wabash Rivers in Northeast Indiana. The second most significant rain event occurred from June 16 through June 19 when an average of just over one half of an inch of rain fell (COOP Data). This rain caused some minor flooding along the St. Marys River.

Flooding was localized in June as intense rains from thunderstorms were concentrated in small areas of the Hydrologic Service Area. Thunderstorms trained over the Upper Wabash River Basin and the St Marys River Basin twice in June. Both coincided with the most significant rain events of the month. Resulting river flooding was in the minor category, however there was a flash flood event over Northwest Ohio on the morning of Tuesday June 17th. Training thunderstorms over Paulding and Defiance counties in Northwest Ohio dropped, a radar estimated, six to ten inches of rain. The rain fell in a 5 hour period from
7 am to 12 pm EST. The rains caused several state and many county roads to be closed. 30 homes in Sherwood Ohio and homes in Delaware Township both in Defiance County were flooded. Homes along Blue Creek in Paulding County battled flood waters. The flooding continued in Paulding County Ohio into the following day. Two flash flood warnings (FFWs), 2 flood warnings (FLWs), 2 flash flood statements (FFSs) and 5 flood statements (FLSs) were issued to cover the flash flooding in Defiance and Paulding counties. One of

the flood statements was issued to cover flooding in Van Wert County in Northwest Ohio.

The Palmer Drought Severity Index for the period ending June 28, 2003 showed that severe drought returned to part of the area. Northwest and North-Central Indiana fell back into severe drought. Moderate drought gripped South Central and Southeast Michigan. Southwest Michigan was on the dry side of normal while Northeast Indiana and Northwest Ohio had near normal soil moisture. The numbers are as follows: Northwest Indiana (-3.41, Severe Drought), North-Central Indiana (-3.12, Severe Drought), Northeast Indiana (-0.64, Normal), Southwest Michigan (-1.35, Dry Side of Normal) South-Central Michigan (-2.34, Moderate Drought), Southeast Michigan (-2.25, Moderate Drought), and Northwest Ohio (-0.44, Normal). Much of the rain that fell in June 2003 occurred in Northeast Indiana and Northwest Ohio.

Temperature: For Fort Wayne, the average high temperature in June 2003 was 76.6 ^{o}F and the average low temperature was 55.3 ^{o}F. This gave an average temperature of 66.0 ^{o}F which was 3.7 ^{o}F below normal. At South Bend, the average high temperature was 77.6 ^{o}F and the average low temperature was 54.6 ^{o}F giving an average temperature of 66.1 ^{o}F which was 2.9 ^{o}F below normal for June. The warmest temperature occurred on the 25th at both Fort Wayne (90 ^{o}F) and South Bend (92 ^{o}F). The lowest temperature occurred on the 2nd at Fort Wayne(41 ^{o}F) and on the 1st at South Bend (36 ^{o}F). The low of 36 ^{o}F at South Bend on June 1 tied the record for that date. June was the 9th coolest at Fort Wayne and the 8th coolest at South Bend on record.

Precipitation: Precipitation was below normal at both Fort Wayne and South Bend in June 2003. At Fort Wayne 3.66 inches of rain fell, 0.38 inches below normal. At South Bend, 1.16 inches of rain fell, 3.03 inches below normal. June 2003 was the 4th driest June on record at South Bend.

Weather: June 2003 continued the cool trend which ended May. This trend continued through June 22. Temperatures averaged 4.4 ^{o}F below normal through the period. Maritime polar air masses dominated the region's weather. There were periodic attempts to stage a warmup, however it was not until last eight days of the month when temperatures would average above normal (0.6 ^{o}F above normal).

The month started out with high temperatures only in the 60s. A cold front swept through the area on the 2nd and 3rd causing light rain which averaged just under a third of an inch across the area (COOP Data). High temperatures fell into the upper 50s at Fort Wayne and the lower 60s at South Bend on the 3rd. High temperatures then slowly warmed up into the lower 70s by the 5th and finally reached 80 ^{o}F by the 11th at Fort Wayne and the 14th at South Bend.

The period of June 11 to 14 saw the heaviest rain event of the month. An average of nearly one and a quarter inches of rain (COOP Data) fell across the area which led to minor flooding along the St Marys and Upper Wabash Rivers. There was also localized urban and small stream flooding. Ten flood statements (FLSs) were issued covering five counties in Northeast Indiana and Northwest Ohio for the urban and small streams flooding. Two flood warnings (FLWs) and three flood statements (FLSs) were issued to cover the river

flooding.

High temperatures in the 70s and 80s continued through the 18th with the warmest temperatures occurring on the 18th when high temperatures reached the mid to upper 80s. The second most significant rain event occurred from the 16th through the 19th as an average of over a half inch of rain fell across the area (COOP Data). The most significant flood event took place on the 17th as a intense band of very heavy rain fell across parts of Northwest Ohio and Northeast Indiana. Radar estimates of six to ten inches fell in a narrow band from the Paulding/Van Wert County line north to central Defiance County. The intense heavy rain caused minor flooding along the St Marys River in Northwest Ohio and Northeast Indiana. Two flash flood warnings (FFWs), 3 flood warnings (FLWs), 2 flash flood statements (FFSs) and 8 flood statements (FLSs) were issued to cover the event and flooding along the St. Marys River. This was the last flood event in June 2003. Once the rainfall ended, high temperatures were pushed back into the mid 70s by the 20th as cooler air again moved into the area.

A warmup then began with high temperatures reaching the mid 80s by the 22nd. The warmup continued through the 25th with high temperatures finally reaching the lower 90s by the 24th at South Bend and the 25th at Fort Wayne. Another cold front then moved through the area on the 26th starting another prolonged period of scattered thunderstorms. An average of just under a half inch of rain fell across the area (COOP Data). The rain event lasted from the 26th through the end of June. Cooler high temperatures accompanied the rain falling into the upper 70s and lower 80s.

For June, 10 Hydrologic Statements (RVSs) were issued to disseminate river forecasts alerting people to the threat of flooding. Two flash flood warnings (FFWs) and 2 flash flood statements (FFSs) were issued to cover flash flooding. Three Flood Warnings (FLWs) and 7 Flood Statements (FLSs) were also issued to cover river flooding in WFO IWX's Hydrologic Service Area in June 2003. Two flood warnings (FLWs) were issued to cover areal flooding. Fifteen Flood Statements (FLSs) were issued for creek and street flooding and to update areal flood warnings in June covering 10 counties in Northern Indiana and Northwest Ohio. Daily River and Lake Summaries (RVDs) and Hydrologic Summaries (RVAs) were also issued on a daily basis as well. A Hydrologic Outlook (ESF) was issued on July 1 to disseminate the tabular form of the probablistic river flood guidance for the Kankakee River Basin that is located in Northwest Indiana produced by AHPS.

NWS FORM E-5 U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH &YEAR):
July, 2003

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
August 4, 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).

Corrected

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

General Overview: July 2003 was cooler and much wetter than normal across Northern Indiana, Northwest Ohio and Extreme Southern Michigan. Precipitation was 4.35 inches above normal. Temperatures averaged 2.0 ^{o}F below normal. (Only NWS Fort Wayne and South Bend data were used).

For the month of July, 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 two significant precipitation events in July 2003 across the Western Lower Great Lakes. The most significant event occurred from July 4 through July 11 when an average of around 4.80 inches of rain fell (COOP Data). This rainfall produced record flooding along the St. Marys and the upper Wabash Rivers in Northeast Indiana. Major flooding occurred along the Tippecanoe River downstream of Norway Dam. Minor to moderate flooding occurred on the Maumee River. Minor flooding occurred along the Auglaize, Eel, Little, Mississinewa and Salamonie Rivers. Numerous flash and areal flooding also occurred with this rain event. The flooding caused extensive damage to property. Estimated damage ran into the millions of dollars.

The flooding began as flash flooding in the Upper Wabash and St. Marys River Basins. This comprises the southern half of WFO IWXs Hydrologic Service Area. Repeated torrential rains fell from the night of July 4 through July 11 led to that flooding. Radar estimated rainfall from July 4 through the morning of July 9th were in the 12 to 15 inch range over parts of Northern Indiana and Northwest Ohio. Runoff from the flash flooding caused the major flooding along the Upper Wabash, Lower Tippecanoe and the St. Marys Rivers. Numerous Flash Flood Warnings (FFWs), Flood Warnings (FLWs), River Flood Warnings (FLWs), Flash Flood Statements (FFSs), Flood Statements (FLSs), Flood Watches (FFAs), and Hydrologic Statements (RVSs) were issued to cover the flooding.

The second most significant rain event occurred from July 20 through July 23 when an average of around one and three quarters of an inch of rain fell across the area (COOP

Data). Heavy rains in the Fort Wayne Metropolitan Area led to flash flooding. Spy Run Creek crested at 11.86 feet on the morning of the 21st which is the second highest on record. There were rises on the Maumee and Wabash Rivers but all managed to stay below flood stage. A Flash Flood Warning (FFW), a Flood Warning (FLW), a Flood Statement (FLS) and a Flash Flood Statement (FFS) were issued to cover the Fort Wayne Flooding.

The Palmer Drought Severity Index for the period ending July 26, 2003 showed quite a change from June's situation. Northern Indiana swung to above normal soil moisture. Northern Indiana soil moisture ranged from the wet side of normal to unusual moist spell. Parts of this area were in severe drought in June. Southern Michigan ranged from normal to moderate drought, and Northwest Ohio was on the wet side of normal. The numbers are as follows: Northwest Indiana (+2.68, Unusual Moist Spell), North-Central Indiana (+2.00, Unusual Moist Spell), Northeast Indiana (+1.72, Wet Side of Normal), Southwest Michigan (-0.48, Normal) South-Central Michigan (-2.22, Moderate Drought), Southeast Michigan
(-2.41, Moderate Drought), and Northwest Ohio (+1.65, Wet Side of Normal).

Temperature: For Fort Wayne, the average high temperature in July 2003 was 82.0 ^{o}F and the average low temperature was 60.7 ^{o}F. This gave an average temperature of 71.3 ^{o}F which was 2.1 ^{o}F below normal. At South Bend, the average high temperature was 81.3 ^{o}F and the average low temperature was 60.9 ^{o}F giving an average temperature of 71.1 ^{o}F which was 1.9 ^{o}F below normal for July. The warmest temperature occurred on the 4th at Fort Wayne (92 ^{o}F) and on the 3rd and 4th at South Bend (92 ^{o}F). The lowest temperature occurred on the 13th at Fort Wayne (54 ^{o}F) and on the 13th and 19th at South Bend (53 ^{o}F). No temperature records were broken or tied in July 2003. July, 2003 was the 11th coolest at Fort Wayne and the 12th coolest at South Bend.

Precipitation: Precipitation was above normal at both Fort Wayne and South Bend in July 2003. At Fort Wayne 9.80 inches of rain fell, 6.22 inches above normal. At South Bend, 6.22 inches of rain fell, 2.49 inches above normal. July 2003 was the 2nd wettest at Fort Wayne and the 5th wettest at South Bend on record. A record 2.76 inches period fell in Fort Wayne on July 6.

Weather: July 2003 started off warm with temperatures in the middle to upper 80s. Maritime Tropical air dominated Lower Great Lakes weather. High temperatures reached the lower 90s by the 3rd of the month and the lower 90s high temperature readings were repeated on the 4th.

By the 4th a shift in the weather patteren occurred which brought a weak cold front into the Western Lower Great Lakes region. Repeated weak weather disturbances moved along the front causing torrential rains over Adams, Allen, Blackford, Cass, Grant, Huntington, Jay, Miami, Pulaski, Starke, Wabash, Wells and White counties in Indiana and over Van Wert County in Northwest Ohio. None of these systems were strong enough to move the front out of the area so heavy rains continued over the same area for nearly one week. This resulted in record flooding along the Wabash and the St. Marys Rivers. The front began moving south the 8th.

Temperatures remained above normal through the 8th averaging 2.9 °F above normal. As the front slipped south, the torrential rains began to taper off. The residual rains added to the the flooding. The St. Marys reached a record crest at Decatur of 26.91 feet on the morning of July 9. A record crest of 21.20 feet on the evening of July 9 occurred at the South Anthony river gauge on the South Side of Fort Wayne on the St. Marys River. Record flooding also occurred along the Wabash River in Southwest Adams County in Northeast Indiana as Linn Grove's river gauge reached a record 14.76 feet on the morning of the 8th. Bluffton on the Wabash River recorded a crest of 18.30 feet on the morning of July 9. That crest was the second highest on record. The record crest of 21.00 feet occurred on March 25, 1913. There was extensive damage across Northern Indiana and Northwest Ohio as a result of the flooding. The dollar amount reached into the millions. Bluffton's waste water treatment plant alone suffered damage of $2 million.

The heaviest rains ended by the 9th, but showers lingered through the 11th. Temperatures moved below normal with highs falling into upper 70s by the 10th. Highs rebounded into the lower to mid 80s by the 14th. A weak cold front moved through the area on the 16th bringing spotty showers and thunderstorms to the Western Lower Great Lakes, Rainfall amounts averaged to just under two tenths of an inch (COOP Data) from the 14th through the16th. There was little change in high temperatures as the front passed. All rivers were back in their banks by the 16th.

A more significant cold front approached the area on the 20th. This system brought a more widespread rainfall event to the Western Lower Great Lakes region. Heavy rainfall extended into Southern Michigan and extreme Northern Indiana which was missed by the earlier big event. Unfortunately, Fort Wayne suffered another flood on the 21st as flash flooding occurred over parts of the west and northwest sides of town. These rains caused more rises on area rivers, but all managed to remain below flood stage. Cooler air behind the front dropped high temperatures into the lower to mid 70s by the 22nd.

High temperatures rebounded into the lower 80s by the 26th but another cold front pushed through the area on the 27th. Again there was heavy rain with this event, but not as heavy as in previous events this month. An average of just over seven tenths of an inch of rain fell across the area on the 27th and 28th (COOP Data). There was no flooding reported from this rain. The last three days of July were dry.

Temperatures ran about 3.4 °F below normal from July 9 through the end of the month.

For July, 36 Hydrologic Statements (RVSs) were issued to disseminate river forecasts alerting people to the threat of flooding. Twenty-two Flash Flood Warnings (FFWs) covering 45 counties and 12 Flash Flood Statements (FFSs) covering 34 counties were issued to cover flash flooding. Thirty-nine Flood Warnings (FLWs) and 73 Flood Statements (FLSs) were issued to cover river flooding in WFO IWX's Hydrologic Service Area in July 2003. Ten Flood Warnings (FLWs) were issued to cover areal flooding for 13 counties. Twenty-two Flood Statements (FLSs) were issued for creek and street flooding and to update areal flood warnings in July covering 50 counties. Eleven Flood Watches (FFAs) covering 208 counties and 10 Flood Statements covering 170 counties to update the flood watches were issued to alert the public to the possibility of flooding. Thirty-four

Daily River and Lake Summaries (RVDs) and the Daily Hydrologic Summaries (RVAs) were issued as well. All of the flooding occurred in Northern Indiana and Northwest Ohio. Two Hydrologic Outlooks (ESFs) was issued to disseminate the tabular form of the probablistic river flood guidance for the Kankakee River Basin in Northwest Indiana and now the Maumee River Basin produced by AHPS. The AHPS probablistic forecasts for the Maumee River Basin became available July 28, 2003.

NWS FORM E-5 U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH &YEAR):
August, 2003

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
September 5, 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: August 2003 was warmer and drier than normal across Northern Indiana, Northwest Ohio and Extreme Southern Michigan. Precipitation was 0.88 inches below normal. Temperatures averaged 1.9 ^{o}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).

Rainfall was distributed unevenly across the area, with the northwest half receiving much below normal rainfall while the southeast half received above normal rainfall.

There were two significant precipitation events in August 2003 across the Western Lower Great Lakes. The most significant event occurred from August 1 through August 5 when an average of around 1.58 inches of rain fell (COOP Data). The heavier rainfall was concentrated over the southeast half of the area. This event produced the only river flooding of the month. The rivers that flooded were, again, concentrated in Northeast Indiana and Northwest Ohio. The Wabash, the St. Marys, the Auglaize, the Maumee and the Fish Creek rose out of their banks in early August in response to heavy rains. All of the flooding was minor with the exception of the St. Marys in Decatur Indiana where the flooding reached the moderate category. No damage was reported with this flooding. An additional factor which led to the flooding was that the soil was quite moist from the flooding rains of July. This flooding was covered by 6 Flood Warnings (FLWs) and 18 Flood Statements (FLSs).

The second most significant rainfall event occurred from August 28 through August 30 when 0.62 inches of rain fell (COOP Data). No river flooding resulted from this rain event.

There were scattered thunderstorms across Northern Indiana, Northwest Ohio and Extreme Southern Michigan in August which caused localized flooding of roads and small streams. These rains occurred from August 1 through August 4, August 9, August 12, August 26

and August 29. A total of 23 Flood Statements (FLSs) covering 38 counties were issued to cover this flood threat.

The Palmer Drought Severity Index for the period ending August 30, 2003 continued to show drought over Southern Michigan and normal to unusually moist soil conditions over Northern Indiana and Northwest Ohio. Northern Indiana soil moisture ranged from the wet side of normal to unusual moist spell. Southern Michigan ranged from the dry side of normal to moderate drought, and Northwest Ohio had unusually moist soil conditions. The numbers are as follows: Northwest Indiana (+1.64, Wet Side of Normal), North-Central Indiana (+1.74, Wet Side of Normal), Northeast Indiana (+2.45, Unusually Moist Soil Conditions), Southwest Michigan (-1.37, Dry Side of Normal) South-Central Michigan (-2.14, Moderate Drought), Southeast Michigan (-2.30, Moderate Drought), and Northwest Ohio (+2.01, Unusually Moist Soil Conditions).

Temperature: For Fort Wayne, the average high temperature in August 2003 was 82.8 ^{o}F and the average low temperature was 62.0 ^{o}F. This gave an average temperature of 72.4 ^{o}F which was 1.3 ^{o}F above normal. At South Bend, the average high temperature was 83.2 ^{o}F and the average low temperature was 62.6 ^{o}F giving an average temperature of 72.9 ^{o}F which was 1.9 ^{o}F above normal for August. The warmest temperature occurred on the 21st at both Fort Wayne (92 ^{o}F) and South Bend (97 ^{o}F). The lowest temperature occurred on the 18th at Fort Wayne (54 ^{o}F) and on the 23rd at South Bend (56 ^{o}F). Fort Wayne tied the record for the coolest high temperature on August 31 when the temperatures rose to only 67 ^{o}F. No temperature records were broken or tied in August 2003 at South Bend. August, 2003 was the 13th warmest at South Bend.

Precipitation: Precipitation was above normal at Fort Wayne and well below normal at South Bend in August 2003. At Fort Wayne 4.08 inches of rain fell, 0.48 inches above normal. At South Bend, 1.75 inches of rain fell, 2.23 inches below normal. August 2003 was the 12th driest at South Bend on record.

Weather: August 2003 started off warm with temperatures in the middle to upper 80s. A cold front approached the area from the northwest on the 1st. Thunderstorms caused moderate to heavy rain crossed the area from northwest to southeast through the 2nd. The front then hung up over Northern Indiana and then moved slowly southeast away from the Western Lower Great Lakes on the 3rd. This slow movement caused rains to linger, especially southeast. Flooding began along the Upper Wabash River on the 2nd and along the St. Marys on the 3rd. The rain finally moved out of the area by the 5th. An average of over one and a half inches of rain fell across the area from the 1st to the 5th (COOP Data). High temperatures fell into the lower 80s on the 2nd and into the upper 70s by the 4th. All rivers were back in their banks by the 8th.

Temperatures remained below normal through the 11th averaging 1.2 ^{o}F below normal. A storm system passed by to the south along that front causing some showers and a few thunderstorms from the 7th through the 9th . High temperatures were confined to the upper 70s to around 80 degree range through the 11th. The rain was heavy enough to prompt an Urban and Small Streams Flood Statement (FLS) for Jay and Blackford Counties in Northeast Indiana on the 9th. An average of only two tenths of an inch of rain fell across

the entire area (COOP Data) in the event so its effects were localized.

The cool air modified in the hot August sun beginning on the 12th as temperatures rose into the lower 80s. Showers and thunderstorms moved into the southern parts of Northern Indiana and Northwest Ohio as the front began moving north toward the area from the 11th through the 13th. The rainfall averaged just under a quarter of an inch (COOP Data). The heavy rains were localized prompting the issuance of three Urban and Small Streams Flood Statements (FLSs) for flood threats over Northwest Ohio. High temperatures rose into the 90s by the 21st. It was quite hot in South Bend as the high temperature reached 97 ^{o}F on that day. Temperatures averaged 3.5 ^{o}F above normal from the August 12 through August 22.

A weak cold front moved through the area on the 21st and 22nd dropping high temperatures back into the 80s. An average of three tenths of an inch of rain fell across the area during that time (COOP Data). No flood threat occurred with this rain event. Temperatures returned to the normal range for the 23rd and 24th.

Temperatures then rebounded into the upper 80s to the lower 90s by 25th as the cool air mass warmed. This continued through the 28th. A cold front approached the area on the 26th. This front combined with the remnants of a front to the south caused a severe weather outbreak across part of Northern Indiana and Northwest Ohio on afternoon of the 26th. Heavy rain preceded the outbreak that morning over Northeast Indiana which prompted the issuance of an Urban and Small Streams Flood Statement for two counties there. An average of just over four tenths of an inch of rain fell on the 26th and 27th (COOP Data). Temperatures averaged 7.2 ^{o}F above normal from 25th through the 29th.

The passage of this severe storm system failed to bring significantly cooler air into the Western Lower Great Lakes as the cold front remained to the northwest. High temperatures remained in the upper 80s to the lower 90s. The front finally made its way across the area on the 29th. This system brought more showers and thunderstorms to the region from the 28th through the 30th. An average of almost two thirds of an inch of rain fell across the area (COOP Data). These storms prompted the issuance of another Urban and Small Streams Flood Statement (FLSs) for one county in Northeast Indiana.

Temperatures finally fell below normal on the 30th and 31st . The cold front was slow to move south of the area and another storm system developed over the southern plains and moved northeast along the frontal boundary. More rain spread into the area on the afternoon of the 31st extending into September 1st. This system will be covered in the September 2003 report. Temperatures averaged 3 ^{o}F below normal for the 30th and 31st.

For August, 17 Hydrologic Statements (RVSs) were issued to disseminate river forecasts alerting people to the threat of flooding. Six Flood Warnings (FLWs) and 18 Flood Statements (FLSs) were issued to cover river flooding in WFO IWX's Hydrologic Service Area in August 2003. Twenty-three Flood Statements (FLSs) were issued for creek and street flooding covering 38 counties. Thirty-four Daily River and Lake Summaries (RVDs) and the ususal Daily Hydrologic Summaries (RVAs) were issued as well. All of the flooding occurred in Northern Indiana and Northwest Ohio. Five Hydrologic Outlooks

(ESFs) was issued to disseminate the tabular form of the probablistic river flood guidance for the Kankakee River Basin in Northwest Indiana and now the Maumee River Basin produced by AHPS. The AHPS probablistic forecasts for the St. Joseph River Basin became available on August 26, 2003.

All temperature data used is NWS Fort Wayne and South Bend data only.

NWS FORM E-5 U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH &YEAR):
August, 2003

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
September 5, 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).

Updated...Additions in Bold Print

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

General Overview: August 2003 was warmer and drier than normal across Northern Indiana, Northwest Ohio and Extreme Southern Michigan. Precipitation was 0.88 inches below normal. Temperatures averaged 1.9 ^{o}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).

Rainfall was distributed unevenly across the area, with the northwest half receiving much below normal rainfall while the southeast half received above normal rainfall.

There were two significant precipitation events in August 2003 across the Western Lower Great Lakes. The most significant event occurred from August 1 through August 5 when an average of around 1.58 inches of rain fell (COOP Data). The heavier rainfall was concentrated over the southeast half of the area. This event produced the only river flooding of the month. The rivers that flooded were, again, concentrated in Northeast Indiana and Northwest Ohio. The Wabash, the St. Marys, the Auglaize, the Maumee and the Fish Creek rose out of their banks in early August in response to heavy rains. All of the flooding was minor with the exception of the St. Marys in Decatur Indiana where the flooding reached the moderate category. No damage was reported with this flooding. An additional factor which led to the flooding was that the soil was quite moist from the flooding rains of July. This flooding was covered by 6 Flood Warnings (FLWs) and 18 Flood Statements (FLSs). **Some of the rains came down hard and as a result, a Flash Flood Warning (FFW) and 2 Flash Flood Statements were issued for Allen County Ohio on the 2nd of the month.**

The second most significant rainfall event occurred from August 28 through August 30 when 0.62 inches of rain fell (COOP Data). No river flooding resulted from this rain event.

There were scattered thunderstorms across Northern Indiana, Northwest Ohio and Extreme

Southern Michigan in August which caused localized flooding of roads and small streams. These rains occurred from August 1 through August 4, August 9, August 12, August 26 and August 29. A total of 23 Flood Statements (FLSs) covering 38 counties were issued to cover this flood threat.

The Palmer Drought Severity Index for the period ending August 30, 2003 continued to show drought over Southern Michigan and normal to unusually moist soil conditions over Northern Indiana and Northwest Ohio. Northern Indiana soil moisture ranged from the wet side of normal to unusual moist spell. Southern Michigan ranged from the dry side of normal to moderate drought, and Northwest Ohio had unusually moist soil conditions. The numbers are as follows: Northwest Indiana (+1.64, Wet Side of Normal), North-Central Indiana (+1.74, Wet Side of Normal), Northeast Indiana (+2.45, Unusually Moist Soil Conditions), Southwest Michigan (-1.37, Dry Side of Normal) South-Central Michigan (-2.14, Moderate Drought), Southeast Michigan (-2.30, Moderate Drought), and Northwest Ohio (+2.01, Unusually Moist Soil Conditions).

Temperature: For Fort Wayne, the average high temperature in August 2003 was 82.8 ^{o}F and the average low temperature was 62.0 ^{o}F. This gave an average temperature of 72.4 ^{o}F which was 1.3 ^{o}F above normal. At South Bend, the average high temperature was 83.2 ^{o}F and the average low temperature was 62.6 ^{o}F giving an average temperature of 72.9 ^{o}F which was 1.9 ^{o}F above normal for August. The warmest temperature occurred on the 21st at both Fort Wayne (92 ^{o}F) and South Bend (97 ^{o}F). The lowest temperature occurred on the 18th at Fort Wayne (54 ^{o}F) and on the 23rd at South Bend (56 ^{o}F). Fort Wayne tied the record for the coolest high temperature on August 31 when the temperatures rose to only 67 ^{o}F. No temperature records were broken or tied in August 2003 at South Bend. August, 2003 was the 13th warmest at South Bend.

Precipitation: Precipitation was above normal at Fort Wayne and well below normal at South Bend in August 2003. At Fort Wayne 4.08 inches of rain fell, 0.48 inches above normal. At South Bend, 1.75 inches of rain fell, 2.23 inches below normal. August 2003 was the 12th driest at South Bend on record.

Weather: August 2003 started off warm with temperatures in the middle to upper 80s. A cold front approached the area from the northwest on the 1st. Thunderstorms caused moderate to heavy rain crossed the area from northwest to southeast through the 2nd. The front then hung up over Northern Indiana and then moved slowly southeast away from the Western Lower Great Lakes on the 3rd. This slow movement caused rains to linger, especially southeast. Flooding began along the Upper Wabash River on the 2nd and along the St. Marys on the 3rd. The rain finally moved out of the area by the 5th. An average of over one and a half inches of rain fell across the area from the 1st to the 5th (COOP Data). High temperatures fell into the lower 80s on the 2nd and into the upper 70s by the 4th. All rivers were back in their banks by the 8th.

Temperatures remained below normal through the 11th averaging 1.2 ^{o}F below normal. A storm system passed by to the south along that front causing some showers and a few thunderstorms from the 7th through the 9th . High temperatures were confined to the upper 70s to around 80 degree range through the 11th. The rain was heavy enough to prompt an

Urban and Small Streams Flood Statement (FLS) for Jay and Blackford Counties in Northeast Indiana on the 9th. An average of only two tenths of an inch of rain fell across the entire area (COOP Data) in the event so its effects were localized.

The cool air modified in the hot August sun beginning on the 12th as temperatures rose into the lower 80s. Showers and thunderstorms moved into the southern parts of Northern Indiana and Northwest Ohio as the front began moving north toward the area from the 11th through the 13th. The rainfall averaged just under a quarter of an inch (COOP Data). The heavy rains were localized prompting the issuance of three Urban and Small Streams Flood Statements (FLSs) for flood threats over Northwest Ohio. High temperatures rose into the 90s by the 21st. It was quite hot in South Bend as the high temperature reached 97 ^{o}F on that day. Temperatures averaged 3.5 ^{o}F above normal from the August 12 through August 22.

A weak cold front moved through the area on the 21st and 22nd dropping high temperatures back into the 80s. An average of three tenths of an inch of rain fell across the area during that time (COOP Data). No flood threat occurred with this rain event. Temperatures returned to the normal range for the 23rd and 24th.

Temperatures then rebounded into the upper 80s to the lower 90s by 25th as the cool air mass warmed. This continued through the 28th. A cold front approached the area on the 26th. This front combined with the remnants of a front to the south caused a severe weather outbreak across part of Northern Indiana and Northwest Ohio on afternoon of the 26th. Heavy rain preceded the outbreak that morning over Northeast Indiana which prompted the issuance of an Urban and Small Streams Flood Statement for two counties there. An average of just over four tenths of an inch of rain fell on the 26th and 27th (COOP Data). Temperatures averaged 7.2 ^{o}F above normal from 25th through the 29th.

The passage of this severe storm system failed to bring significantly cooler air into the Western Lower Great Lakes as the cold front remained to the northwest. High temperatures remained in the upper 80s to the lower 90s. The front finally made its way across the area on the 29th. This system brought more showers and thunderstorms to the region from the 28th through the 30th. An average of almost two thirds of an inch of rain fell across the area (COOP Data). These storms prompted the issuance of another Urban and Small Streams Flood Statement (FLSs) for one county in Northeast Indiana.

Temperatures finally fell below normal on the 30th and 31st . The cold front was slow to move south of the area and another storm system developed over the southern plains and moved northeast along the frontal boundary. More rain spread into the area on the afternoon of the 31st extending into September 1st. This system will be covered in the September 2003 report. Temperatures averaged 3 ^{o}F below normal for the 30th and 31st.

For August, 17 Hydrologic Statements (RVSs) were issued to disseminate river forecasts alerting people to the threat of flooding. Six Flood Warnings (FLWs) and 18 Flood Statements (FLSs) were issued to cover river flooding in WFO IWX's Hydrologic Service Area in August 2003. Twenty-three Flood Statements (FLSs) were issued for creek and street flooding covering 38 counties. Thirty-four Daily River and Lake Summaries (RVDs)

and the ususal Daily Hydrologic Summaries (RVAs) were issued as well. **One Flash Flood Warning (FFW) and 2 Flash Flood Statements were issued in August, 2003.** All of the flooding occurred in Northern Indiana and Northwest Ohio. Five Hydrologic Outlooks (ESFs) was issued to disseminate the tabular form of the probablistic river flood guidance for the Kankakee River Basin in Northwest Indiana and now the Maumee River Basin produced by AHPS. The AHPS probablistic forecasts for the St. Joseph River Basin became available on August 26, 2003.

All temperature data used is NWS Fort Wayne and South Bend data only.

NWS FORM E-5 U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH &YEAR):
September, 2003

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
October 6, 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: September, 2003 was cooler and wetter than normal across Northern Indiana, Northwest Ohio and Extreme Southern Michigan. Precipitation was 1.27 inches above normal. Temperatures averaged 1.9 ^{o}F below normal. (Only NWS Fort Wayne and South Bend data were used).

For the month of September, the average high temperature was in the lower 70s, the average low temperature was in the lower 50s giving an average temperature in the lower 60s. (Only NWS Fort Wayne and South Bend data were used).

The rainfall pattern continued from August with the northwest half drier than the southeast half of Northern Indiana's (IWX) Hydrological Service Area (HSA).

There were three significant precipitation events in September 2003 across the Western Lower Great Lakes. The most significant event occurred from August 31 through September 3 when an average of around 2.40 inches of rain fell (COOP Data). Two Flood Watches (FFAs) for 36 counties were issued on September 1 in anticipation of flooding that day. One Flood Statement (FLS) was issued to update the Flood Watches. The rain did cause minor flooding along the Eel, Auglaize and the Upper Wabash Rivers on the 2nd and 3rd. This flooding was covered by the issuance of 4 Flood Warnings (FLWs) and 9 Flood Statements. Three Urban and Small Streams Flood Statements were also issued to cover the local small stream and creek flood threat. These statements covered a total of 75 counties in Northern Indiana and Northwest Ohio.

The second most significant rainfall event occurred from September 21 through September 25 when around 1.80 inches of rain fell (COOP Data). All rivers and streams were well below flood stage and were able to handle the runoff, thus no flooding resulted from this rainfall. However river levels were elevated enough so that the next rainfall event, third most significant (September 26 to September 30, around 1.1 inches (COOP Data)) caused minor flooding along the St. Marys and Upper Wabash Rivers. Three Flood Warnings (FLWs) and 7 Flood Statements (FLSs) were issued to cover the river flooding.

Isolated thunderstorms occurred on September 8 which caused some street flooding in Dekalb County in Northeast Indiana. One Urban and Small Streams Flood Statement (FLS) was issued to cover this event.

There was lowland flooding near rivers as well as street flooding, but no flood damage reports were received with any of the flooding in September, 2003.

The Palmer Drought Severity Index for the period ending September 27 showed continued improvement in soil moisture conditions, especially across Southern Michigan where soil moisture swung into the normal range from moderate drought. Northern Indiana soil moisture ranged from "Unusual Moist Spell" to "Very Moist Spell". Northwest Ohio soil moisture was in the "Very Moist Spell" category. The numbers are as follows: Northwest Indiana (+2.73, Unusual Moist Spell), North-Central Indiana (+3.11, Very Moist Spell), Northeast Indiana (+3.93 Very Moist Spell), Southwest Michigan (-0.37, Normal) South-Central Michigan (-0.45, Normal), Southeast Michigan (+0.39, Normal), and Northwest Ohio (+3.66, Very Moist Spell).

Temperature: For Fort Wayne, the average high temperature in September 2003 was 72.1 ^{o}F and the average low temperature was 50.8 ^{o}F. This gave an average temperature of 61.5 ^{o}F which was 2.6 ^{o}F below normal. At South Bend, the average high temperature was 71.9 ^{o}F and the average low temperature was 52.8 ^{o}F giving an average temperature of 62.3 ^{o}F which was 1.1 ^{o}F below normal for September. The warmest temperature occurred on the 13th at both Fort Wayne (83 ^{o}F) and South Bend (85 ^{o}F). The lowest temperature occurred on the 30th at both Fort Wayne (37 ^{o}F) and at South Bend (39 ^{o}F). The record for the lowest high temperature at both Fort Wayne and South Bend was broken for September 1 when the high temperature reached only 64 ^{o}F at Fort Wayne and only 62 ^{o}F at South Bend.

Precipitation: Precipitation was above normal at Fort Wayne and just below normal at South Bend in September 2003. At Fort Wayne 5.44 inches of rain fell, 2.63 inches above normal. At South Bend, 3.69 inches of rain fell, 0.10 inches below normal. The rainfall record for September 22nd was broken at Fort Wayne when 1.24 inches of rain fell.

Weather: September 2003 started off cooler than normal across the Western Lower Great Lakes region. The heavy rains of September 1 and 2 led to record low maximum temperatures for Labor Day which was September 1. High temperatures failed to get out of the 60s. Cool Canadian high pressure kept the cool air flowing into the region which kept high temperatures in the 70s for the most part of the first 7 days of September. Temperatures averaged 4 ^{o}F below normal across the region.

Warmer air finally made it into the area by the 8th pushing high temperatures into the lower 80s at both Fort Wayne and South Bend. A weak warm front heralded the arrival of the warmer air. Widely scattered thunderstorms over Northeast Indiana caused some minor street flooding in Dekalb County on the 8th. The arrival of the warmer air marked the start of the warmest period of the month. The highest temperatures of the month occurred on the 13th at both Fort Wayne and South Bend with high temperatures reaching the low to

mid 80s. From the 8th through the 18th , temperatures averaged 4 °F above normal. Some passing showers fell across the area from the 13th through the 15th as a weak cold front passed through the region. High temperatures were pushed back into the 70s during this time. However temperatures rebounded back into the lower 80s by the 17th as warm air returned.

A stronger cold front then moved toward the Western Lower Great Lakes on the 18th bringing in much colder air. High temperatures were driven down into the upper 60s by the 19th of the month. A second wet period began which would later cause more minor flooding along some rivers in Northeast Indiana. A series of storm systems moved across the area causing persistent rain showers and some thunderstorms. From the 21st through the 25th an average of around 1.83 inches of rain (COOP Data) fell across the area. As mentioned above no flooding occurred with this event. High temperatures oscillated between the middle 60s and lower 70s during this time.

The rains of September 21 through 25 set up the minor river flooding by elevating river and stream levels. From the 26th through the 30th another round of rain totaling around 1.1 inches (COOP Data) fell. It was this event that caused the minor flooding along the Upper Wabash and St. Marys Rivers. The bulk of the rain in this event fell on the 26th. Following this storm system, much colder air swept into the region dropping high temperatures into the 50s. From the 18th through the 30th temperatures averaged 5.4 °F below normal with the last three days averaging 11 °F below normal.

For September, 19 Hydrologic Statements (RVSs) were issued to disseminate river forecasts alerting people to the threat of flooding. Seven Flood Warnings (FLWs) and 16 Flood Statements (FLSs) were issued to cover river flooding in WFO IWX's Hydrologic Service Area in September 2003. Two Flood Watches (FFAs) covering 36 counties were issued and one Flood Statement updating a Flood Watch was issued to cover flood threats. Four Flood Statements (FLSs) were issued for creek and street flooding covering 76 counties. Thirty-three Daily River and Lake Summaries (RVDs) and the ususal Daily Hydrologic Summaries (RVAs) were issued as well. All of the flooding occurred in Northern Indiana and Northwest Ohio. Six Hydrologic Outlooks (ESFs) was issued to disseminate the tabular form of the probablistic river flood guidance for the Kankakee River Basin in Northwest Indiana, the Maumee River Basin in Northeast Indiana and Northwest Ohio as well as the St. Joseph River Basin in Northern Indiana and Extreme Southern Michigan produced as a part of AHPS.

All temperature data used is NWS Fort Wayne and South Bend data only.

NWS FORM E-5 U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH &YEAR):
October, 2003

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
November 13, 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).

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

General Overview: October, 2003 was cooler and drier than normal across Northern Indiana, Northwest Ohio and Extreme Southern Michigan. Precipitation was 0.61 inches below normal. Temperatures averaged 1.5 ^{o}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 lower 60s, the average low temperature was around 40 ^{o}F giving an average temperature in the lower 50s. (Only NWS Fort Wayne and South Bend data were used).

There was only one significant precipitation event in October 2003 across the Western Lower Great Lakes. It occurred from the 13th through the 17th when an average of 1.09 inches of rain fell across the area.(COOP Data). Area rivers and stream rose some, but all remained well below flood stage.

The Palmer Drought Severity Index for the period ending November 1 showed all areas with normal to well above soil moisture. Soil moisture conditions ranged from normal to "Very Moist Spell" with the wettest conditions occurring over Northern Indiana and Northwest Ohio. The numbers are as follows: Northwest Indiana (+2.50, Unusual Moist Spell), North-Central Indiana (+3.06, Very Moist Spell), Northeast Indiana (+3.81 Very Moist Spell), Southwest Michigan (+1.01, Normal) South-Central Michigan (+0.65, Normal), Southeast Michigan (+1.51, Normal), and Northwest Ohio (+3.68, Very Moist Spell).

Temperature: For Fort Wayne, the average high temperature in October 2003 was 61.7 ^{o}F and the average low temperature was 39.4 ^{o}F. This gave an average temperature of 50.5 ^{o}F which was 1.9 ^{o}F below normal. At South Bend, the average high temperature was 61.6 ^{o}F and the average low temperature was 40.5 ^{o}F giving an average temperature of 51.0 ^{o}F which was 1.1 ^{o}F below normal for October. The warmest temperature occurred on the 8th at Fort Wayne (79 ^{o}F) and on the 20th at South Bend (82 ^{o}F). The lowest temperature occurred on the 24th and 27th at Fort Wayne (30 ^{o}F) and on the 6th at South Bend (29 ^{o}F).

Precipitation: Precipitation was below normal at both Fort Wayne and South Bend in October 2003. At Fort Wayne 2.01 inches of rain fell, 0.62 inches below normal. At South Bend, 2.68 inches of rain fell, 0.59 inches below normal. No accumulating snow fell across the area in October 2003.

Weather: October 2003 started off much cooler than normal across the Western Lower Great Lakes region. Temperatures averaged around 10 ^{o}F below normal from the 1st through the 7th as a cool Canadian airmass dominated the region. Somewhat warmer air moved into the region on the 3rd and the 4th as an average of a quarter of an inch of rain (COOP Data) fell across the area as a weak warm front advanced.

High temperatures were in the lower to middle 50s for the first three days. High temperatures slowly warmed into the upper 50s on the 4th and reached the lower 60s on the 5th. High temperatures finally reached the lower to middle 70s on the 7th. Temperatures went above normal across the entire region on the 8th and stayed that way through the 13th. The warmest temperature of the month was recorded at Fort Wayne during this time period. Temperatures averaged about 7 ^{o}F above normal from the 8th through the 13th across the entire area.

The warm spell ended on the 14th as a cold front and associated storm system crossed the region. This storm system produced the heaviest precipitation of the month with an average of 1.09 inches of rainfall (COOP Data). The heaviest rains in this event fell on the 14th and 15th. High temperatures fell from the 70s on the 13th to the 50s on the 14th. This cool spell was not as strong as the one which plagued the area through the first three days of October as high temperatures oscillated between the middle 50s and lower 60s. Temperatures averaged about 4 ^{o}F below normal from the 14th through the 18th.

Warm air made its return on the 19th as temperatures soared into the upper 70s to lower 80s Temperatures rose to 82 ^{o}F at South Bend on the 20th of the month for the warmest day of the month. No precipitation accompanied this warm up. This warm spell lasted only three days with temperature averaging about 5.5 ^{o}F above normal.

Colder air again moved into the area behind a cold front which swept across the area on the 21st. High temperatures fell from the middle to upper 60s on the 21st to the lower 50s on the 22nd. Little precipitation fell with this frontal passage. Warm air moved back into the area by the 24th as high temperatures rose back into the lower 60s, but a storm system and associated cold front moved through on the 25th causing rain showers and a few thunderstorms. An average of around 0.6 inches of rain(COOP Data) fell from the 24th through the 26th. High temperatures were pushed down into the middle 40s by the 27th. Another weak weather system moved across the are from the 27th through the 30th causing some very light rains to fall across the area. An average of a little more than a tenth of an inch fell with this system. From the 22nd through the 29th, temperatures average around 4 ^{o}F below normal.

Warm air again invaded the area on the 30th pushing high temperatures back into the upper 60s and lower 70s. Temperature averaged about 13 ^{o}F above normal on the 30th and 31st. .

None of the rain fall events produced any flooding. Some moderate rises did occur on area rivers. Much of that rise resulted from the rains of October 13 through October 17. River levels, however, remained well below flood stage.

For October, 8 Hydrologic Statements (RVSs) were issued to disseminate river forecasts alerting people to the threat of high water. The daily River and Lake Summary along with the daily Hydrologic Summary were issued. Three Hydrologic Outlooks (ESFs) was issued to disseminate the tabular form of the probablistic river flood guidance for the Kankakee River Basin in Northwest Indiana, the Maumee River Basin in Northeast Indiana and Northwest Ohio as well as the St. Joseph River Basin in Northern Indiana and Extreme Southern Michigan. This product is part of the new Advance Hydrologic Prediction Service.

All temperature data used is NWS Fort Wayne and South Bend data only.

NWS FORM E-5 U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH &YEAR):
November, 2003

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
December 2, 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).

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

General Overview: November, 2003 was warmer and slightly wetter than normal across Northern Indiana, Northwest Ohio and Extreme Southern Michigan. Precipitation was 0.10 inches above normal. Temperatures averaged 3.6 ^{o}F above normal. (Only NWS Fort Wayne and South Bend data were used).

For the month of November, the average high temperature was in the lower 50s, the average low temperature was in the middle 30s giving an average temperature in the middle 40s. (Only NWS Fort Wayne and South Bend data were used).

There were only two significant precipitation event in November 2003 across the Western Lower Great Lakes. The first occurred from November 15 through November 21 when an average of 1.26 inches of precipitation (mostly rain) fell across the area.(COOP Data). Rivers in the Kankakee and Maumee River Basins approached flood stage, but stayed below. The second event occurred from November 23 through November 24 when an average of 0.70 inches of rain fell (COOP Data). Again, there were rises on area rivers, but all remained below flood stage. The rivers most affected by this event were the Auglaize in Northwest Ohio, the St. Marys in Northeast Indiana and Northwest Ohio and the Blanchard in Northwest Ohio. All of these rivers are in the Maumee River Basin.

A third event contained the first measurable snowfall and that occurred from November 26 through November 29 when an average of 0.39 inches of precipitation fell, again mostly rain. The snow fall amounted to an average of 0.3 inches (COOP Data). There were unofficial reports of 4 inches in Scott Indiana, 4.5 inches at Marcellus Michigan and 3 inches at Albion Indiana. Most of the snow was the result of the development of a lake effect snow band which formed during the early morning hours of November 29th. All of the snow melted by November 30 with no impact on any rivers and streams.

The Palmer Drought Severity Index for the period ending November 29 showed all areas with above to extremely above normal soil moisture. Soil moisture conditions ranged from "Unusually Moist" to "Extremely Moist Spell" with the wettest conditions occurring over Northern Indiana. The numbers are as follows: Northwest Indiana (+3.30, Very Moist

Spell), North-Central Indiana (+3.79, Very Moist Spell), Northeast Indiana (+4.12 Extremely Moist Spell), Southwest Michigan (+2.84, Unusually Moist Spell) South-Central Michigan (+2.70, Unusually Moist Spell), Southeast Michigan (+2.49, Unusually Moist Spell), and Northwest Ohio (+3.94, Very Moist Spell).

Temperature: For Fort Wayne, the average high temperature in November 2003 was 52.7 ^{o}F and the average low temperature was 36.3 ^{o}F. This gave an average temperature of 44.5 ^{o}F which was 3.9 ^{o}F above normal. At South Bend, the average high temperature was 51.0 ^{o}F and the average low temperature was 35.6 ^{o}F giving an average temperature of 43.3 ^{o}F which was 3.2 ^{o}F above normal for November. The warmest temperature occurred on the 3rd and 4th at Fort Wayne (76 ^{o}F) and on the 4th at South Bend (73 ^{o}F). The lowest temperature occurred on the 9th at both Fort Wayne (19 ^{o}F) and at South Bend (18 ^{o}F). Record high temperatures was set at Fort Wayne on November 3rd and 4th when the thermometer reached 76 ^{o}F. The high temperature at Fort Wayne on the 3rd tied the record high which was last set in 1987. The high temperature at Fort Wayne on the 4th broke the previous record of 74 ^{o}F which was set back in 1964.

Precipitation: Precipitation was below normal at Fort Wayne and above normal at South Bend in November 2003. At Fort Wayne 2.42 inches of rain fell, 0.56 inches below normal. At South Bend, 4.15 inches of rain fell, 0.76 inches above normal. Accumulating snow fell over parts of Northern Indiana, Extreme Southern Michigan and Northwest Ohio. Only 0.7 inches fell at Fort Wayne, 2.3 inches below normal and only 0.2 inches fell at South Bend, 7.5 inches below normal for November. Two precipitation records were set at South Bend in November, 2003. 1.47 inches of rain fell at South Bend on the 18th which broke the old record of 1.22 inches set back in 1985. Another precipitation record fell on the 23rd when 1.03 inches of rain fell. The old record of 0.86 inches occurred back in 1970.

Weather: November 2003 started off mild with high temperatures in the upper 50s across the Western Lower Great Lakes Region. Maximum temperatures quickly rose into the 70s by the 3rd at Fort Wayne and the 4th at South Bend. Record warmth was recorded at Fort Wayne on the 3rd and the 4th when the high temperature reached 76 ^{o}F. The temperature rose to 73 ^{o}F at South Bend. Temperatures averaged 11.2 ^{o}F above normal for the first 5 days of November. There was spotty light rain through the 3rd producing an average of nearly two tenths of an inch (COOP Data) as warm air pushed into the region.

A cold front approached the region from the west causing rain showers across the area from the 4th through the 6th with an average of around a third of an inch (COOP Data) of rainfall reported. The front passed through the region late on the 5th causing temperatures to take an abrupt swing to colder on the 6th as high temperatures plummeted into the upper 40s.

Cold Canadian high pressure took over the region's weather from the 6th through the 10th with the coldest temperatures of the month occurring on the 9th as low temperatures fell into the upper teens that morning. Temperatures averaged 9.1 ^{o}F below normal during this time period.
Canadian high pressure moved east and warm air begin a return behind a warm front as high temperatures rose into the 60s by the 11th. Again light rain fell ahead of the system with an average of around a quarter of an inch of rainfall (COOP Data). Temperatures

averaged 10.8 ^{o}F above normal across the area on the 11th and 12th.

This warmup was short lived. A cold front swept through the region by the 13th pushing high temperatures to around 40 ^{o}F. Some snow flurries accompanied the cold air as Fort Wayne reported flurries on the 13th and South Bend reported flurries on the 12th, 13th, and the 14th. Temperatures averaged 5.4 ^{o}F below normal from the 13th through the 15th.

An extended period of above normal temperatures began on the 16th and lasted to the 23rd. A warm front moved across the area on the 16th. High temperatures rose into the 50s by the 17th and into the low 60s by the 18th. A series of storm systems moved through the Western Lower Great Lakes region. The most significant precipitation event of the month occurred during this time. An average of one and a quarter inches of precipitation (COOP Data) fell. A majority of it fell on the 18th and 19th with an average of nearly an inch of rainfall (COOP Data). The rain caused significant rises on area rivers and streams, however no flooding was reported from this event. The heaviest rains occurred over the northwest half of the Hydrological Service Area (HSA) which was the driest part of the HSA. The location of the rain band gave relief to parts of Northeast Indiana and Northwest Ohio which were ravaged by flooding in July. The distribution of the rainfall managed to avert any flooding. Temperatures from th 16th through the 23rd averaged 11.2 ^{o}F above normal.

Another cold air mass moved into the area on the 23rd as a cold front swept across the Western Lower Great Lakes region. This produced the second most significant precipitation event of the month with an average of around seven tenths of an inch of rain fall. There were some snow flurries as the precipitation pushed east. Area rivers and streams rose again following this rain but remained below flood stage. High temperatures in the lower 60s on the 23rd dropped into the upper 30s on the 24th and 25th. Temperatures averaged 4.0 ^{o}F below normal for these two days.

Temperatures began a slow warm up from the 26th to the end of the month. A weak storm system moved through the area on the 26th and 27th which produced just under four tenths of an inch of precipitation. It remained cold enough, however, on the 28th and 29th to produce a long band of lake effect snow across parts of Northern Indiana, Extreme Southern Michigan and it extended all the way into Northwest Ohio. Amounts ranged from around a half inch to 4.5 inches. All the snow melted by the 30th. There were no rises on area rivers and streams in response to either the rains or to the melting snow. Temperatures averaged 2.8 ^{o}F above normal from the 26th through the end of the month. Stream flows were in the normal to above normal range as November ended.

For November, 22 Hydrologic Statements (RVSs) were issued to disseminate river forecasts alerting people to the threat of high water. The daily River and Lake Summary along with the daily Hydrologic Summary were issued. Three Hydrologic Outlooks (ESFs) was issued to disseminate the tabular form of the probablistic river flood guidance for the Kankakee River Basin in Northwest Indiana, the Maumee River Basin in Northeast Indiana and Northwest Ohio as well as the St. Joseph River Basin in Northern Indiana and Extreme Southern Michigan. This product is part of the new Advance Hydrologic Prediction Service. Two more Hydrologic Outlooks were also issued to alert the public to the possibility of flooding on November 18th.

All temperature data used is NWS Fort Wayne and South Bend data only.

NWS FORM E-5 U.S. DEPARTMENT OF COMMERCE
NOAA, NATIONAL WEATHER SERVICE

HSA OFFICE:
North Webster, IN

REPORT FOR (MONTH &YEAR):
December, 2003

MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS

DATE:
January 6, 2004

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, 2003 was warmer and drier than normal across Northern Indiana, Northwest Ohio and Extreme Southern Michigan. Precipitation was 0.77 inches below normal. Temperatures averaged 2.7 ^{o}F above normal. (Only NWS Fort Wayne and South Bend data were used).

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

There were four significant precipitation event in December 2003 across the Western Lower Great Lakes. The first occurred from December 4 through December 6 when an average of 0.40 inches of precipitation (mostly snow) fell across the area.(COOP Data). Snow amounts averaged around 3 inches. There were amounts in the 4 to 6 inch range over parts of Northwest Ohio and Northeast Indiana. The second event occurred from December 8 through December 12 when an average of 0.53 inches of precipitation (mostly rain) fell (COOP Data). The rain melted all of the recently fallen snow which caused significant rises on rivers in the Upper Wabash and Maumee River Basins. However all managed to stay below flood stage.

The third event occurred from December 22 through December 25 (Christmas Day) when an average of 0.98 inches of precipitation fell (COOP Data). This caused renewed rises on area rivers in Northeast Indiana and Northwest Ohio. This time, there was minor flooding along the Tiffin in Northwest Ohio and the Wabash in Northeast Indiana. The Tiffin at Stryker in Northwest Ohio crested at 11.25 feet, just 0.25 feet above the 11 foot flood stage. At Bluffton in Northeast Indiana, the Wabash River crested at 11.5 feet, 1.5 feet above the 10 foot flood stage. Only lowland near the rivers was flooded. No damage was reported. Three Flood Warnings (FLWs) and 7 Flood Statements (FLSs) were issued to cover the flood threat.

The fourth event occurred from December 28 through December 30 when an average of 0.5 inches of precipitation (mostly rain) fell (COOP Data). Area rivers again rose in response

to the precipitation, however all remained below flood stage and were below flood stage as December ended.

Despite the drier than normal precipitation totals in December, the Palmer Drought Severity Index for the period ending January 3, 2004 showed all areas with above to extremely above normal soil moisture. Soil moisture conditions ranged from "Unusually Moist" to "Extremely Moist Spell" with the wettest conditions occurring over Northern Indiana. The numbers are as follows: Northwest Indiana (+3.22, Very Moist Spell), North-Central Indiana (+4.14, Extremely Moist Spell), Northeast Indiana (+4.98 Extremely Moist Spell), Southwest Michigan (+2.19, Unusually Moist Spell) South-Central Michigan (+2.76, Unusually Moist Spell), Southeast Michigan (+3.33, Very Moist Spell), and Northwest Ohio (+4.20, Extremely Moist Spell).

Temperature: For Fort Wayne, the average high temperature in December 2003 was 37.0 ^{o}F and the average low temperature was 24.9 ^{o}F. This gave an average temperature of 31.0 ^{o}F which was 2.0 ^{o}F above normal. At South Bend, the average high temperature was 38.0 ^{o}F and the average low temperature was 26.2 ^{o}F giving an average temperature of 32.1 ^{o}F which was 3.4 ^{o}F above normal for December. The warmest temperatures occurred on the 28th at Fort Wayne (53 ^{o}F) and on the 10th and 28th at South Bend (50 ^{o}F). The coldest temperature occurred on the 13th and 20th at Fort Wayne (14 ^{o}F) and on the13th at South Bend (13 ^{o}F).

Precipitation: Precipitation was below normal at both Fort Wayne and South Bend in December 2003. At Fort Wayne 2.62 inches of rain fell, 0.15 inches below normal. At South Bend, 1.70 inches of rain fell, 1.39 inches below normal. The entire area of Northern Indiana, Northwest Ohio and Extreme Southern Michigan received accumulating snow. At Fort Wayne,10.9 of snow fell, 2.6 inches above normal for December. At South Bend, 10.5 of snow fell, 8.7 inches below normal for December. The record for the most snowfall on a December 5th at Fort Wayne was tied when 5 inches fell. There was no snow cover in the area as December, 2003 ended.

Weather: December 2003 started off with high temperatures in the 40s (above normal), but high temperatures cooled into the middle to upper 20s by the 7th. The first significant snow event occurred from December 4 through 6 with an average of around 3 inches across the area (COOP Data). There were reports of 5 to 6.5 inches of snowfall across parts of Northwest Ohio and Northeast Indiana. Temperatures averaged 1.6 ^{o}F below normal for the first 7 days of the month.

Temperatures began a warmup on the 8th. High temperatures reached the upper 40s to around 50 by the 10th. A rain event began on the 8th and lasted into the 12th. An average of around a half inch of rainfall (COOP Data) across the area in this event. The rain and warmer temperatures melted the recently fallen snow causing significant rises on rivers in Northeast Indiana and Northwest Ohio. However none of the rivers rose above flood stage. Temperatures averaged 7.8 ^{o}F above normal through the 10th.
Cold Canadian air invaded the Western Lower Great Lakes region on the 11th. The rain event that began on the 8th ended with a light dusting of snow as high temperatures fell back into middle to upper 20s by the 12th. Temperatures averaged 5.5 ^{o}F below normal

through the 14th.

Temperatures warmed into the 30s by the 15th as warmer air returned to the area. Temperatures rose into the lower 40s by the 16th, but a cold front pushed high temperatures back into the 20s by the 17th. The second significant snow event began on the 16th as rain. The rain fall was light, and quickly changed to snow. An average of 1.2 inches of snow fell across the area, but there was band of heavier snow over the northern quarter of Northern Indiana and Southern Michigan. Reports of 4 to 6 inches of snowfall were common in Southwest Lower Michigan and Northwest and North Central Indiana. The primary cause of the snowfall was lake effect off of Lake Michigan. Temperatures averaged about 0.4 ^{o}F below normal from the 15th through the 20th.

The rest of December 2003 was warmer than normal as warmer Maritime Polar air overspread the region. High temperatures rose into the middle 40s by the 22nd. Colder air moved into the area as a storm system and associated cold front passed through the area on the 23rd. This system spread a widespread rain band across the area with an average of nearly one inch of rainfall (COOP Data) occurring. Then cold Canadian air overspread the region leading to a lake effect snow event on the 24th. An average of only 1.2 inches of snow fell across the entire area, however there were reports of over 3 inches in Northwest Indiana near Lake Michigan. The rain event led to minor flooding along the Tiffin and Upper Wabash from Christmas to December 27th. More rain fell from the 28th into the 30th as warm air again moved into the area. An average of about a half inch of rain fell (COOP Data). Area rivers rose again, but the rises did not lead to any renewed flooding. Temperatures rose into the lower 50s on the 28th before another cold front crossed the region producing the rain. High temperatures were pushed down into the upper 30s by the 29th as the rain event ended with a few snow flurries. High temperature again rose into the 40s as December ended. Temperatures averaged about 9 ^{o}F above normal from the 21st to the end of December 2003.

For December, 3 Flood Warnings (FLWs) and 7 Flood Statements (FLSs) were issued for flooding in Northeast Indiana and Northwest Ohio around Christmas Day. Also 19 Hydrologic Statements (RVSs) were issued to disseminate river forecasts alerting people to the threat of high water in Indiana and Ohio. The Daily River and Lake Summary along with the Daily Hydrologic Summary were issued as usual. Five Hydrologic Outlooks (ESFs) was issued to disseminate the tabular form of the probablistic river flood guidance for the Kankakee River Basin in Northwest Indiana, the Maumee River Basin in Northeast Indiana and Northwest Ohio as well as the St. Joseph River Basin in Northern Indiana and Extreme Southern Michigan. This product is part of the Advance Hydrologic Prediction Service.

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