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Staff Papers Series

P81-31

December 1981

MINNESOTA ECONOMIC INDICATORS

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Staff papers are published without formal review within the Department
of Agricultural and Applied Economics

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Acknowledgements

This report is based, in part, on current studies of the Minnesota economy funded by the Minnesota Agricultural Experiment Station. I acknowledge also the pertinent suggestions I have received from David Dahl, Jerrold Peterson, and Ronald Shirk on existing local economic indicator series overlooked earlier in the preparation of this report.

Abstract

Minnesota economic indicators include a wide variety of current statistical series prepared in various state and federal agencies and reported periodically in agency publications. The focus of this report is the organization of the various statistical series into a set of state and local economic indicators for Minnesota, including a monthly index of leading economic indicators. This index would serve in an important way in signalling turning points in economic activity, specifically, in Minnesota and its substate regions.

Summary and Conclusions

Many statistical series on the Minnesota economy are currently prepared and periodically reported by several state and federal agencies. The Minnesota Department of Economic Security assembles numerous statistical series on industry employment, earnings and weekly hours, and personal and disposable income. The Minnesota Department of Revenue assembles a wide variety of tax and other revenue statistics and, also, data on business gross receipts and purchases. The Minnesota Department of Finance and the State Auditor assemble similar data series on Minnesota state and local income and expenditures. The Minnesota Department of Economic Development has had a long history of tracking the performance of the Minnesota economy with a host of industry employment, earnings, investment, and sales variables. The Minnesota Department of Agriculture is also an energetic participant in this massive effort in statistical entrepreneurship. Yet, not one of these agencies, nor any federal office in Minnesota, nor any academic department of the University of Minnesota, nor any private research group can provide a consistent and accurate series of state and substate leading economic indicators.

The task of assessing the current status of Minnesota economic indicators and the prospects for constructing, maintaining and using an index of state and local leading indicators is neither simple nor widely supported. Fragmentation of effort has been a basic premise of data preparation and use in the public interest. Moreover, this onerous task is addressed here by (1) a review and critique of existing U.S., state, and substate economic indicator series and (2) a proposal for preparation of a Minnesota state and substate index of leading indicators. Both topics require an overall conceptual framework for organizing the review and critique and, subsequently, the preparation of a set of state and local leading economic indicators for

Minnesota.

Not having an internally consistent, integrated set of state and local indicators is, in one sense, a blessing in disguise: It offers an opportunity to adopt the most promising elements of existing state and local indicators without some of the costs of learning by doing. The Bureau of Business and Economic Research in Kentucky, for example, developed a comprehensive economic data bank, including numerous leading, roughly coinciding, and lagging economic indicators. It did not develop, however, an index of leading indicators. The M.E. Upjohn Institute of Kalamazoo, Michigan, on the other hand, supported the development of an index of leading indicators for the 11 Standardized Metropolitan Statistical Areas of Michigan. The composite index has a reasonably good record of anticipating recent cyclical turning points (which, of course, are now of even greater concern in Michigan than five years ago when the study was initiated). Data Resources, Incorporated, also is in the business of constructing and interpreting the use of state and local indicators.

For Minnesota, a first step towards the construction and use of a monthly index of leading indicators (ILI) is the organization of existing statistical series into a set of economic indicators. Much effort is expended in preparing and reporting the existing statistical series. This effort would be even more productive if directed towards the building and maintenance of a comprehensive series of Minnesota economic indicators.

A second step towards the construction and use of a Minnesota ILI series is the enrichment of the existing economic data series with additional variables pertaining to (1) consumption and distribution, (2) fixed capital investment, and (3) inventory investment. No agency presently collects these data in Minnesota.

A third step towards the construction and use of a Minnesota ILI series is a central place for its preparation, validation, and interpretation. Typically, a University bureau of business and economic research has stepped forward to perform this task. More recently, private research and consulting firms, like Data Resources, Incorporated and Chase Econometrics, have stepped into this void.

With the successful completion of these steps, the unending task still remains of always improving existing capabilities. In this case, the set of economic indicators and, specifically, the index of leading indicators, is only one of several approaches to economic forecasting. Another approach is the building of econometric models, based partly on individual leading indicators, but, also, on lagging, and various unlabeled, indicators. These, and other, approaches are sorely needed to improve our collective capacities for coping with the inevitable change and uncertainties stemming from a dynamic and largely uncontrollable national economy of which Minnesota's economy is an integral part.

MINNESOTA ECONOMIC INDICATORS

Wilbur R. Maki

State and local economic indicators are prepared for several purposes, including their direct use in forecasting, especially of turning points in regional business cycles. They serve as an early warning system of imminent changes in regional business conditions and they also provide measures of the severity and scope of regional recessions.

U.S. economic indicators are the prototype of state and regional indicators. They are the U.S. counter part of the state and substate regional indicators reviewed in this proposal. Selected state and regional indicators are compared with the U.S. indicator series in coverage and construction. Uses of the state and substate indicator series in business and government also are compared with the corresponding U.S. series.

Minnesota economic indicators differ from U.S. economic indicators simply because the Minnesota economy is not identical to the U.S. economy. Even if the two economies were identical, the sampling frame for certain economic series, including the geographical scale of the activity itself, precludes the preparation of individual state-level estimates. Exceptions occur, of course, where a U.S. series is built up from county and state series.

U.S. Indicator Series

U.S. economic indicator series are published monthly by the U.S. Department of Commerce. These series were developed initially by Wesley C. Mitchell and colleagues in the National Bureau of Economic Research. They were refined and subsequently published in 1967 in the report, "Indicators of Business Expansions and Contractions," by Geoffrey H. Moore

and Julius Shiskin. A cross-classification of these series, by economic process and cyclical timing, is presented in Table 1. This classification shows 12 leading, six roughly coincident, and six lagging, indicators. Six economic processes are delineated to which the 12 leading indicators refer. The roughly coincident indicators cover only to the employment-related and production-related processes while the lagging indicators refer to the remaining four processes, which pertain to investment, inventories, prices, and money supply.

The 12 leading indicators have provided an average lead time of 8.5 months for the four recessions in the past 20 years. This series has given numerous false starts (of recession that never took place). Two of the series -- net change in inventories and index of net business formation -- are not available at the scheduled release time of the composite series. One of the indicators, MI, had outlived its usefulness by 1979.

Modification of the 12-indicator series has been recommended. For example, one proposal called for the deletion of four of the 12 series (9, 10, 11 and 12) and the replacement of MI with M2 in the index of leading indicators (ILI), which is a composite of the 12 leading indicators (3). This composite series is cited because it serves as a model for the construction of a state and a metropolitan area ILA (25). Even for the U.S., the composite series is undergoing some modification as economic conditions and structures change.

Geoffrey Moore has noted that sometimes lagging indicators serve as leading indicators (31). The downturns of the lagging indicators have consistently preceded the upturns of the leading indicators while upturns in the lagging indicators have consistently preceded downturns in the leading indicators. This record goes back to 1885. Numerous studies have

Table 1. Cross-Classification of U.S. Economic Indicators by Economic Process and Cyclical Timing.

Economic Process	Cyclical Timing		
	Leading	Roughly Coincident	Lagging
Employment and unemployment	Average workweek, mfg. New unemp. insurance claims, inverted	Nonfarm employment Unemployment, inverted	Long-duration unemployment, inverted
Production, income consumption, trade	New orders, consumer goods and materials	Gross national product Industrial production Personal income Manufacturing and trade sales	
Fixed capital investment	Formation of business enterprises Contracts and orders, plant and equipment Building permits, housing		Investment expenditures, plant and equipment
Inventories and inventory investment	Changes in business inventories		Business inventories
Prices, costs, and profits	Industrial materials prices Stock prices Profits Ratio, price to unit labor cost		Change in output per manhour, mfg., inverted
Money and credit	Change, consumer instalment credit		Commercial and industrial loans outstanding Bank interest rates on business loans

Source: Geoffrey H. Moore, "Is an International Recession Brewing?" National Bureau of Economic Research Reporter, March 1978, pp. 10-16.

confirmed this relationship. Again, the U.S. experience in the interpretation and use of its economic indicators serves as a model in the preparation and use of corresponding state and local indicator series.^{1/}

State and Regional Indicators

State and regional economic indicators are now widely published by university bureaus of business and economic research and state planning agencies. Especially in the 1970's, the number of indicator series published increased sharply, in part as a response to the increasing severity of the general business cycle on state and local economies. Both Chase Econometrics and Data Resources, Incorporated found a ready market for their services in providing their clients with individual state and major metropolitan area economic indicators and forecasts.

Most state and local economic indicators are confined to employment and unemployment, earnings and income, population and labor force, and state and local revenues and expenditures. For some metropolitan areas, a consumer price index is derived, as well as selected financial series, like bank deposits and loans. Building permit data are collected, also, including number and value. Each of the statistical series is identified in the discussion of the three prototype state and local indicator series -- the Data Resources Incorporated (DRI) state and major metropolitan area series, the Michigan metropolitan area series, and the Kentucky statewide indicators of economic activity.

^{1/} A list of selected references covering all indicator series published monthly by the U.S. Department of Commerce was recently compiled by Geoffrey Moore which provides in-depth discussion of the conceptual and statistical development of each of the 24 indicator series -- 12 leading, 6 coincident, and 6 lagging. See: "Why Do the Leading Indicators Lead? An NBER Reading List," NBER Reporter, March 1978, pp. 16-17.

DRI indicator series

Series of leading economic indicators were prepared by DRI for the Boston Globe. These series are available individually and as a composite indicator. Six sectors of the New England economy are represented by the 10 leading indicator series, as follows:

<u>Economic Sector and Indicator</u>	<u>Months Leading</u> ^{2/}	
	<u>Peak</u>	<u>Trough</u>
Employment and Unemployment:		
1. Avg. weekly hrs.of prod. workers, mfg. (New Eng.)	13	1
2. Inverse of layoff rate (New Eng.)	11	5
Consumption and Distribution:		
3. Pct. companies rptg. more orders received (Boston area)	15	6
4. Pct. companies rptg. slower deliveries (U.S.)	11	7
Fixed Capital Investment:		
5. New building permits (New Eng.)	15	11
Inventory Investment:		
6. Pct. companies repg. higher inventories (New Eng.)	15	4
Prices, Costs and Profits:		
7. Index of stock prices (U.S.)	9	8
8. Pct. chg. in prices of raw materials (U.S.)	11	7
Money and Credit:		
9. Money supply (U.S.)	14	10
10. Chg. consumer installment credit outstanding (First Distr.)	11	4

Individual indicators were reported with leads of nine to 15 months at a peak and one to 11 months at a trough. Four of the indicators pertain to New England, one to the Boston area, one to the First Federal Reserve District, and four to the U.S. All indicators are seasonally adjusted.

The 10 component variables in the Globe/DRI ILI are weighted equally. Variables which display extreme volatility (i.e., average weekly hours, the

^{2/} Individual variables are plotted against total nonagricultural employment, which is used as standard of reference for determining upturns and downturns in regional business cycle.

layoff rate, new orders, housing permits, inventories, the index of sensitive prices, and the change in consumer installment debt outstanding) are included in moving average form. Production and income are not included in the ILI because most series in this group were reported with cyclical timing which has been roughly coincident rather than leading.

Michigan indicator series

The Michigan metropolitan area indicator series were developed by Kuzlowski and associates for 11 Standard Metropolitan Statistical Areas in Michigan.^{3/} Kuzlowski has proposed the construction and use of an ILI for specific small areas (23, 24, 25). The most recently proposed Kuzlowski-ILI is a composite of four local quarterly indicators, as follows (25):

1. Average workweek of production workers in local manufacturing industries;
2. Average weekly initial claims for unemployment insurance (inverted);
3. Constant dollar value of total deposits at local commercial banks;
4. Number of new private housing units authorized by building permit.

Each of the four quarterly series was classified as a good leading indicator of local business activity.

The forecasting performance of the composite ILI was evaluated according to several well-accepted criteria. The results generally showed that the composite ILI predicted turning points in the local business economies reasonably well.

Kentucky indicator series

The series of Kentucky monthly indicators of economic activity, published quarterly by the Kentucky Council of Economic Advisors, College

^{3/} This study was conducted under the auspices of the W. E. Upjohn Institute for Employment Research, Lakamazoo, Michigan. It included the following SMSA's: Ann Arbor-Ypsilanti, Battle Creek, Bay City, Detroit, Flint, Grand Rapids, Jackson, Kalamazoo, Lansing, Muskegon, and Saginaw.

of Business and Economics, University of Kentucky, were started in 1977 (21).

The individual series cover eight sectors of the Kentucky economy as follows:

Labor Force:

1. Labor force, total civilian
2. Employment, by place of residence (2)
3. Unemployment rate
4. Employment, non-agricultural wage and salary (10)

Hours and Earnings of Prod. Workers, Mfg.:

5. Average weekly hours prod. workers, mfg. (2)
6. Average hourly earn. prod. workers, mfg. (2)
7. Average weekly earn. prod. workers, mfg. (2)

Index of Prices Received by Farmers (1972 = 100):

8. Index of prices rec. by Ky farmers (2)

Mining:

9. Coal, physical output (2)
10. Average hourly earn., prod. workers (2)
11. Average weekly hours, prod. workers
12. Tax receipts, coal severance, total

Construction, No. of Priv. Res. Units:

13. Value of construction contracts, res. & non-res., no. of units (2)
14. Permit authorized construction
15. Value of permit authorized construction (2)

Retail Sales

16. Tax receipts
17. New passenger car registration

Finance and Insurance:

18. Net loans made and acquired by Ky. S&LA
19. Sales of ordinary life insurance

Selected State Government Receipts:

20. Tax and nontax receipts (4)
21. Tax receipts, state road fund, state share (2)

Several indicator series are represented by two or more subtotals, as indicated by the numerical entries (in parentheses). Unlike the Globe/DRI or the Michigan series, a Kentucky ILI is not available.

Minnesota Economic Indicators: A New Series

A set of Minnesota economic indicators which extend both the DRI and the Michigan indicator series is proposed for Minnesota. The proposed Minnesota Economic Indicators (MEI) series would include current quarterly employment, unemployment, including quit and layoff rates, earnings, income, population and labor force series published monthly and quarterly by the Minnesota Department of Economic Security and the U.S. Department of Commerce and, also, selected local financial and price indicators, including new building permits, bank loans and deposits, and agricultural marketings and prices. Selected leading indicators are included, finally, in a Minnesota ILI series.

Current local indicators

Current Minnesota monthly and quarterly indicators of economic activity, which are reported in Review of Labor and Economic Conditions and its supplement, Current Minnesota Labor Market Conditions, are summarized in Table . The data series are compiled by the Research and Statistical Service Office, Minnesota Department of Economic Security. These series, like the Kentucky economic indicators, parallel corresponding U.S. data series published regularly by the U.S. Bureau of Labor Statistics and the U.S. Department of Commerce (10,37).

For some years, a local business index has been published by the Bureau of Business and Economic Research, University of Minnesota, Duluth, for the Duluth Metropolitan area.^{4/} Included with the monthly reporting of the local business index are series of individual business indicators, like postal receipts, bank debits, commercial and industrial electric power use, residential electrical power use, freight carloadings, retail sales, building permits, and employment.

^{4/} Duluth Business Indicators, Bureau of Business and Economic Research, University of Minnesota, Duluth, in cooperation with the Regional LMI Center, Department of Economic Security. See, also, Jerrold M. Peterson, Glenn O. Gronsett, and Pat Lam, Development of a regional business index: a case study of the ARBI, Working Paper No. 80-6, Bureau of Business and Economic Research, University of Minnesota, Duluth, 1980.

Table 2. Current Monthly and Quarterly Economic Indicators for Minnesota, 1981.

Economic Indicator	Monthly	Quarterly
Labor Force (person count):		
1. Labor force, total civilian	X	X
2. Employed	X	X
3. Unemployment rate (2) <u>1/</u>	X	X
Work Force (job count);		
4. Work force, total civilian	X	
5. Employed, agr.	X	
6. Employed, nonagr.	X	
7. Unemployment rate (2)	X	
Estimates of Labor Turnover, Mfg.:		
8. New hires	X <u>2/</u>	X
9. Quits	X <u>2/</u>	X
10. Layoffs	X <u>2/</u>	X
Persons Claiming Unemployment Benefits:		
11. Personal claiming benefits, number (6)	X <u>2/</u>	X
Nonagricultural Wage & Salary Employment, Hours & Earnings:		
12. Employment (42)		
13. Prod. workers, avg. weekly earn. (30)	X	X
14. Prod. workers, avg. hourly earn. (30)	X	X
15. Prod. workers, avg. weekly hrs. (30)	X	X
	X	X
Output and Expenditures:		
16. Retail sales		
17. Building permits authorized, priv. housing	X <u>2/</u>	X
units (from U.S. Commerce)	X <u>2/</u>	X
Money and Credit Conditions:		
18. Discount rate (on 3-month treasury bill)	X <u>2/</u>	X
19. Rate of conventional mortgage		X
Income:		
20. Total personal income		X
21. Per capita personal income (2)		X
22. Real median family money income (2)		X
23. Earnings of wage and salary workers, mfg. (10)		X
Prices:		
24. Consumer Price Index (5)	X <u>3/</u>	X

1/ Unemployment rate for civilian labor force is reported monthly, by metropolitan area and nonmetropolitan counties.

2/ Available, also, by month, but currently not published.

3/ Available every other month.

Industry-specific indicators are available, which represent employment, earnings and weekly hours series; these are identified by the numerical entries in parentheses. The monthly series are published by the 15th of the second month following the month reported in Current Minnesota Labor Market Conditions, or the Review of Labor and Economic Conditions. The publication lag for the quarterly series is slightly greater than for the monthly series (relative to the last month in each quarter-year).

Index of leading indicators

An index of Minnesota leading indicators can be constructed from a small number of the economic indicators published periodically by the Minnesota Department of Economic Security and an even smaller number of additional statistical series available through the Federal Reserve Bank of Minneapolis. The Minnesota ILI would be comparable to the Michigan four-variable series. Its extensions could incorporate the same U.S. statistical series included in the Globe/DRI ILI.

Some cautionary notes: First, the Globe/DRI ILI is compared with total nonagricultural employment, which, in itself is only roughly coincident with gross regional product. Generally, total nonagricultural employment lags changes in gross regional product. On the other hand, changes in employment in cyclically-sensitive industries, like construction and durable goods manufacturing, are more closely correlated with changes in gross regional product.

Second, use of total nonagricultural employment as a reference series for an ILI would neglect the sometimes considerable effects of the agricultural sector on total economic activity. The Kentucky economic indicators at least include an index of prices received by farmers for crops and livestock. Minnesota economic indicators would need to include

variables measuring, not only farm prices, but, also, cash receipts from farm marketings and realized net income, exclusive of imputed income and rent.

A Minnesota monthly ILI is proposed, therefore, as a composite index of four to 10 variables selected from the following:

<u>Economic Sector and Indicator</u>	<u>Source</u>
Employment and Unemployment:	
1. Average work week, construction	MDES
2. Average work week, mfg.	MDES
3. Labor turnover, quits	MDES
4. Labor turnover, layoffs, inverted	MDES
5. New unemployment insurance claims, inverted	MDES
Consumptions and Distribution	
6. Retail sales (selected)	NDR
7. Industrial use of electricity (resi.adj.)	NSP
Fixed Capital Investment:	
8. Buidlng permits authorized, priv. housing	USDC
9. Total hours worked, construction	MDES
10. State use tax receipts	MDR
Inventory Investment:	
(none)	
Prices, Costs, and Profits:	
11. Consumer Price Index	MDES
12. Net realized farm income, less imputed income	USDC
13. Regional stock price index	Dain Bosworth
Money and Credit:	
14. Total bank deposits	MFRB
15. Total bank loans	MFRB

Each of the 15 statistical series listed above, except the CPI, is available for Minnesota and in several cases, selected substate areas, like the Minneapolis-St. Paul Metropolitan Statistical Area (SMSA).

Constructing Minnesota Economic Indicator Series

A majority of the economic variables needed for the proposed new Minnesota ILI is being estimated currently in research offices of the Minnesota Department of Economic Security, the Minnesota Department of Revenue, and the Federal Reserve Bank of Minneapolis. Most needed now is

an analytical framework and a consistent methodology for the preparation of the individual monthly series and, also, for the validation and maintenance of the entire set of economic indicators. This framework also would provide for the use of variables in the construction of a monthly leading indicator series for Minnesota and its substate regions.

Preparation of individual monthly indicator series

In the early stages of constructing a Minnesota economic indicator series, data and data preparation procedures would need documentation and, also, review for internal consistency and accuracy. Candidate series for this review include current personal income estimates prepared by the Minnesota Department of Economic Security. Guidelines for the assembly and processing of additional economic data series would be undertaken in this review.

The publication format of the Kentucky economic indicator series cited earlier would serve equally well for Minnesota. The Kentucky data series are compared with corresponding U.S. monthly data series. Quarterly economic forecasts are presented, also, along with revenue and other special-purpose forecasts. The quarterly and monthly series presented in the Review of Labor and Economic Conditions would compare closely with the regularly published Kentucky economic indicator series with the additional data cited earlier (see, p. 7), which pertain to retail sales, finance and insurance, and state government receipts.

Selected monthly indicator series would be compiled by quarter-year for possible use in an economic forecasting function. Again, the reporting of the Kentucky forecast serves as a prototype for the reporting of a Minnesota economic forecast series. The forecast series would be available for comparison with the index of leading indicators and the individual leading indicator series.

Preparation of an agricultural economic indicator series is an essential part of this proposal. Monthly cash receipts from crop and livestock marketings can be prepared from corresponding U.S. series and Minnesota farm price, acreage, and inventory series. A rural Minnesota indicator series could be prepared, also, from the farm series when supplemented with a new rural industry employment and earnings series.

Coordination, validation and maintenance of MEI series

In a majority of states, a university research office serves as the central place for the coordination, validation and maintenance of a state economic indicator series. In Minnesota, lack of such a central place necessitates alternate arrangements for accomplishing the same purposes. A local research and/or statistical service enterprise can be organized, if not already available, for organizing the delivery and use of monthly data series acquired from several sources, as noted earlier.

In the validation of the Minnesota leading indicator series, a Minnesota Gross State Product (GSP) series could serve as an alternate reference series. Use of the Minnesota GSP would correspond to use of the U.S. Gross National Product in the evaluation of the 12 U.S. leading indicators. Much additional work is required, however, in the development of improved data sources and statistical procedures for deriving a monthly or quarterly Minnesota GSP series.

Finally, maintenance of a MEI series is a continuing effort which depends, in part, on user support of this service function and, in part, on provider support of its wide use in special-purpose studies and forecasts. In the mid-1970's, when funding sources were available for maintaining, as well as constructing, an extensive MEI series, its potential uses were not only poorly perceived, but oftentimes grossly distorted and minimized.

Again, the internal competition which emerged from the fragmentation of research and statistical services in Minnesota state government precluded the successful emergence of a central economic data base and methodology for economic and fiscal forecasting and planning. Budgetary constraints of the 1980's may eliminate this competition by default and provide, instead, an overriding rationale for the exercise of frugality and economy in the provision of essential statistical services for the effective management of state government. It is in this latter spirit that the proposal for developing a set of Minnesota economic indicators is offered.

Delivery and use of a monthly leading indicator series

The research offices of the Minnesota Department of Economic Security and the Federal Reserve Bank of Minneapolis with their strong commitment in current economic data collection, processing, and dissemination, may be appropriate candidates for the delivery of a set of monthly economic indicator series for general public use. If the existing economic data series were supplemented by additional data on (1) consumption and distribution (e.g., new orders received), (2) fixed capital investments (e.g., new plant expansion), and (3) inventory investment, then a set of Minnesota leading indicators, which closely paralleled the U.S. leading indicator series, could be prepared. Periodic business surveys to obtain part of the missing data have been undertaken in past years by the College of Business Administration, University of Minnesota and the Minnesota Department of Economic Development.

Given timely access to a set of leading indicators, as suggested earlier, series of Minnesota statewide and substate leading economic indicators could become available for (1) the preparation of statewide and substate regional ILI series and (2) the preparation of statewide and substate

regional economic forecasts based on the individual leading (and, also, roughly coincident and lagging) indicator series. The preparation of the ILI series would require prior agreement on a schedule of publication of the individual monthly economic indicators.

The ILI series would have a diversity of uses insofar as it provides an early warning system of impending turning points in state and sub-state economic conditions. It would serve, also, as a readily accessed and widely understood measure of regional economic well-being. Thus, it would provide a complementary reference series for state economic and fiscal forecasts, particularly for those outside the inner circles of technical forecast providers and their associates and supervisors.

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