

NHKL

NOAA MIAMI LIBRARY

Library

U. S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
WEATHER BUREAU

REPORT OF THE 1967
INTERDEPARTMENTAL HURRICANE WARNING CONFERENCE, ATLANTIC
Miami, Florida

January 30 - February 1, 1967

Washington, D. C.
February 1967

Property of
NOAA Miami Library
4301 Rickenbacker Causeway
Miami, Florida 33149

014044

QC
944
.I4
1967

CONFERENCE DELEGATES

Air Force

Col. W.S. Barney
Col. N.H. Chavasse
Col. R.A. Kerr
Col. R. Moeller
Lt.Col. H.R. Montague
Lt.Col. J.M. Dunn
Lt.Col. P.A. Steves
Lt.Col. E.L. Jenner
Lt.Col. R.H. Foote
Maj. W.D. Brockmeyer
Maj. W.E. Smurro
Maj. John Moran
Capt. J.H. Wood
Capt. L.E. Sandoral
Capt. J.D. Hoppes
Capt. R. Beauchemin
Lt. W. Dorn
M/Sgt. G.H. Neilly
Mr. R.E. Hairston
Mr. G.J. Finger

Navy

CAPT R.M. Cassidy
CAPT J.P. Fleet
CAPT M.A. Eaton
CAPT J.P. King
CAPT J.E. Hansen
CAPT H.A. McCreery
CAPT M.B. Moreland
CDR R.J. Himelick
CDR J.C. Garland
CDR S.C. Balmforth
CDR J.D. McGill
CDR K.R. Bare
LCDR F. Nelson
LCDR D.H. Edgren
LT W.H. Ledbetter
LT D.J. Evers
LT T. Deagan
LT C.G. Steinbruck
AGC C.E. Francisco

Coast Guard

CDR W.T. Adams

ESSA

Dr. R.C. Gentry
Dr. B.I. Miller
Mr. H.F. Hawkins
Mr. J. Tracy
Mr. H.J. Mason, Jr.
Mr. W.S. Callahan
Mr. R.L. Sardquist
Mr. Wm. J. Freedman
Mr. R.E. Beck

ESSA-WB

Dr. R.H. Simpson
Dr. G.E. Dunn
Mr. A.L. Sugg
Mr. W. Davis
Mr. D.H. Shideler
Mr. R.H. Kraft
Mr. S.O. Grimm, Jr.
Mr. R.E. Helbush

FAA

Mr. H.C. Henline
Mr. L.O. Maxwell
Mr. James Corretjer
Mr. H.E. Mount
Mr. O.J. Cowart
Mr. J.J. Staut
Mr. A.D. Scott
Mr. G.T. Dalton
Mr. Q.E. Edwards
Mr. G.B. Fox

Univ. of Miami

Mr. H.W. Hiser
Mr. H.V. Senn
Mr. R.D. Stearns

WORKING COMMITTEES

Reconnaissance

Co-Chairman Col. Kerr (USAF)
Co-Chairman CAPT Moreland (USN)
CAPT Cassidy (USN)
CDR McGill (USN)
CDR Balmforth (USN)
CDR Himelick (USN)
CDR Bare (USN)
LCDR Nelson (USN)
LT Evers (USN)
Col. Barney (USAF)
Col. Chavasse (USAF)
Lt.Col. Dunn (USAF)
Lt.Col. Jenner (USAF)
Mr. Hairston (USAF)
Mr. Stout (FAA)
Mr. Cowart (FAA)
Mr. Dalton (FAA)
Dr. Gentry (ESSA)
Mr. Callahan (ESSA)
Mr. Werley (ESSA)
Mr. Grimm (USWB)
Mr. Kraft (USWB)

Communications

Chairman Mr. Henline (FAA)
Mr. Maxwell (FAA)
Mr. Corretjer (FAA)
Mr. Mount (FAA)
Maj. Moran (USAF)
Capt. Beauchemin (USAF)
Capt. Hoppes (USAF)
Capt. Sandoral (USAF)
Lt. Dorn (USAF)
M/Sgt. Neilly (USAF)
CAPT McCreery (USN)
LCDR Nelson (USN)
LT Deagan (USN)
CDR Adams (USCG)
Mr. Sardquist (ESSA)
Mr. Freedman (ESSA)
Mr. Davis (USWB)
Mr. Redus (USWB)

Forecasts and Warnings

Chairman Mr. Sugg (USWB)
Mr. Helbush (USWB)
Dr. Miller (ESSA)
Mr. Tracy (ESSA)
Mr. Beck (ESSA)
Lt.Col. Foote (USAF)
Lt.Col. Montague (USAF)
Maj. Brockmeyer (USAF)
Capt. Wood (USAF)
Mr. Finger (USAF)
CAPT Fleet (USN)
CAPT Eaton (USN)
CAPT King (USN)
LT Steinbruck (USN)
LT Ledbetter (USN)
AGC Francisco (USN)

REPORT OF THE 1967

INTERDEPARTMENTAL HURRICANE WARNING CONFERENCE, ATLANTIC

The 21st Annual Interdepartmental Hurricane Warning Conference convened at 9 A.M. January 30, 1967. Dr. Gordon Dunn, Director, National Hurricane Warning Service welcomed the delegates to Miami and invited the heads of the participating delegations to offer a few opening remarks. Colonel W. S. Barney, Vice Commander Air Weather Service; Captain R. M. Cassidy, Assistant Director Naval Weather Service; Mr. Hugh Henline, FAA Communication Staff; and Dr. R. H. Simpson, Associate Director of Meteorological Operations, Weather Bureau responded.

Dr. Dunn then asked for reports on the General Agenda Items.

1. Aircraft Reconnaissance Operations (USAF, USN, ESSA-RFF)

The various meteorological agencies reviewed their reconnaissance mission and capabilities for 1967. (Attachments A, B and C)

2. Report on Hurricane Research and Plans (ESSA-NHRL)

Dr. Gentry discussed the National Hurricane Research Laboratory programs and plans. Mr. Tracy presented verification results for the 1966 hurricane forecasts. (Figures 1 through 8 and Tables 1-5)

3. Description of the Operational Meteorological Satellite System and Data Expected from it during the 1967 Hurricane Season (ESSA)

Dr. Simpson discussed the amount and area of coverage to be available from satellites during the 1967 season. (Attachment D)

Dr. Dunn then presented the agenda to the delegates and assignment of agenda items was made to the three working committees. The plenary session was then adjourned. Committee discussions began at 1 P.M. of the 30th and continued through the 31st.

The second and final plenary session was called to order at 9 A.M. February 1st by the conference chairman. It was agreed by the members that only controversial items would be read and discussed. Committee chairman presented their package of recommendations or conclusions and they were adopted with only minor editorial changes. Dr. Dunn thanked the chairman of each committee and the entire conference for their diligent and expedient handling of the agenda. The heads of the delegations expressed their appreciation for Dr. Dunn's cooperation and leadership during the past 12 years in the hurricane warning program. Since Dr. Dunn will be retiring after the next hurricane season, he expressed appreciation to all agencies for the cooperation and excellent working relationships in the Hurricane Warning Conferences and the National Hurricane Warning Service. The conference was then adjourned.

SUMMARY MINUTES

1. AIRCRAFT RECONNAISSANCE

1.1 Detailed Eye Report (USN)

DISCUSSION: Weather Bureau desires an eye data format which can be digitized. The Navy desires clarification on temperature data at or near the eye. The Air Force would like to keep the format standardized for both the Atlantic and Pacific. An ADHOC committee on reviewing the two forms agreed by amplifying three items, the form would meet all Atlantic requirements and should suffice for the Pacific since nothing was deleted.

CONCLUSION: The Air Force will reaccomplish the form for publication in the Hurricane Plan. Coordination with both agencies in the Pacific area will be accomplished at the same time.

1.2 Air Force "Out" and "In" Reports (USN)

DISCUSSION: The Air Force does not send "in" and "out" reports and the Navy would like to know if aircraft are on track or have aborted the mission. Information is available at CARCAH if desirable.

RECOMMENDATION: Air Force will send "in" and "out" messages on storm missions -

From 53 ACP -

With heading for automatic distribution as follows:

10LTRS
NNNN AA CR 4LF
HRCP URXX DTG
CR 4LF
NNNN
10LTRS

1.3 Safety of Aircraft (USN)

DISCUSSION: It is imperative that two or more aircraft operating in the storm area must maintain voice contact. There is some reason to believe that this fact requires emphasis. Air Force and Navy concur.

RECOMMENDATION: Paragraph 5(f), page 13 of the AHP should be emphasized by underlining.

1.4 Clearance through Warning Areas (USN)

DISCUSSION: CARCAH in the past has coordinated in trying to obtain permission for reconnaissance aircraft to enter USAF Eastern Test range warning area. The Navy desires CARCAH attempt to obtain permission to enter warning areas W-151 and W-470.

RECOMMENDATION: CARCAH will continue to try and obtain permission for aircraft to enter warning areas, but final clearance responsibility rests with the operational unit making the reconnaissance fix. Annex 3, Form 4, Page 22 of Hurricane Plan be changed as follows: Items 1, 2 and 3 delete clearance through restricted area--obtained/not obtained, and add flight planned coordinated/or not coordinated with Missile Test Ranges. Item 4 change to read Request ATC priority. Item 5 - delete.

1.5 Navy Reconnaissance Aircraft Call Signs (USN)

DISCUSSION: Navy would like to use three numbers after Navy Hurreco in sparse data areas. FAA stated that if five digits are used with Hurreco filed in Remarks in the flight plan that this will identify aircraft.

RECOMMENDATION: Navy will use 5 digit call sign for identification purpose and record Hurreco in remarks section of flight plan for easy identification for FAA.

1.6 Multiple Storm Flights (USN)

DISCUSSION: One incident occurred in the past season where an aircraft was in the storm and not reported in the Plan of the Day. All units concerned are interested for safety reasons that all aircraft entering the storm are reported in the Plan of the Day.

RECOMMENDATION: VW-4, 53 WRS, and RFF will notify CARCAH of all weather reconnaissance aircraft under their control that are flying in a storm area in order that they can be coordinated in the Plan of the Day.

1.7 Peripheral Data (WB)

DISCUSSION: The Weather Bureau continues to have the requirement for peripheral data and desires that the Air Force and Navy continue to provide what they can within their present capability. Air Force will attempt to provide WB-47's and some WC-130's for peripheral data. The Navy stated they had no increased capability for peripheral data this season.

CONCLUSION: Peripheral data is still a requirement for the Weather Bureau and every attempt will be made to furnish this reconnaissance within the present capabilities.

1.8 Cuban Reconnaissance (WB)

DISCUSSION: The Weather Bureau feels that reconnaissance on either side of Cuba is desirable and that also overflight of Cuba to storm areas is beneficial.

CONCLUSION: Take note of the Weather Bureau requirement.

1.9 Change in MHRCA Designation (USAF)

DISCUSSION: The Air Force desires to change the designator for Mr. Hairston from Military Hurricane Reconnaissance Coordinator Atlantic to Chief, Aerial Reconnaissance Coordination, Atlantic Hurricanes (CARCAH). Mr. Hairston is presently arranging Atlantic reconnaissance for other purposes besides hurricanes. The new designator is more befitting his over-all workload.

RECOMMENDATION: The 1967 Hurricane Plan reflect that -- Mr. Hairston is now known as Chief, Aerial Reconnaissance Coordination, Atlantic Hurricanes (CARCAH).

1.10 Airspace Reservations (FAA)

DISCUSSION: FAA desired that the committee recognize that the item on airspace reservation is applicable not only to Stormfury but to all storm reconnaissance since airspace is blocked in each case. This item was taken up in reconnaissance committee although it was listed under Communications.

CONCLUSION: Take note and refer to the Stormfury Committee. This item also is applicable to airspace reservations for storm reconnaissance and was recognized as such by the committee.

1.11 Inclusion of Reconnaissance Reports in Annual Report for the Atlantic (ESSA)

DISCUSSION: A decision was made by the Interdepartmental Committee for Meteorological Services to eliminate complete summaries of weather reconnaissance data from the Annual Report on Atlantic Storms to reduce the volume and cost of the report. Reconnaissance data are forwarded to NWRC for repositing.

RECOMMENDATIONS: That this item be considered by the Sub-committee on Basic Meteorological Services to determine how to most effectively and economically make aircraft reconnaissance data on tropical cyclones available for research purposes.

2. FORECASTS AND WARNINGS

2.1 Verification Procedures for Hurricane Forecasts (ESSA)

DISCUSSION: The Weather Bureau recommended that forecast position times be changed to 0000Z, 0600Z, 1200Z, and 1800Z to correspond with procedures currently in use by the military agencies in the Western Pacific. This will enhance use of and comparison with computer products and reduce the workload associated with verifications. The Navy requested clarification of the impact of this proposal on issuance times of military advisories. The Weather Bureau stated that issuance times will not change.

RECOMMENDATIONS: Revise paragraph 2a (2) of ANNEX 2 to read:

- (2) Scheduled Advisories: After the initial advisory is issued, advisories will be issued at the standard hours of 0400, 1000, 1600, and 2200 GCT. 12, 24, 48 and 72 hour forecast periods will be based on the latest 6-hourly synoptic time.

2.2 Hurricane Names (WB)

DISCUSSION: The Weather Bureau proposed that the listing of names in ANNEX 7 be revised to delete "Faith" for further use; delete "Debra" from 1967 and substitute "Doria"; and use the 1966 list for 1970 with "Francelia" used in lieu of "Faith".

RECOMMENDATIONS: Revise ANNEX 7 by:

- (1) Substitute "Francelia" for "Faith" in the 1966 list and redesignate the list as 1970.
- (2) Substitute "Doria" for "Debra" in the 1967 list.
- (3) Add paragraph 4 as follows:
 4. The U.S. Weather Bureau, through the Director of the National Hurricane Warning Services shall: Assign names to tropical storms and hurricanes and to tropical depressions which are expected to reach tropical storm intensity.

2.3 Requesting Assignment of Names for Tropical Cyclones East of 35°W (USN)

DISCUSSION: This item was withdrawn by the Navy.

RECOMMENDATION: Withdrawn.

2.4 Naming Tropical Cyclones Solely on Satellite Data (USN)

DISCUSSION: The Navy suggests that care be used in naming tropical cyclones solely on the basis of satellite data.

RECOMMENDATIONS: That NHC use the following guidelines when naming tropical cyclones on the basis of satellite data:

- (1) That satellite pictures not be the sole basis for naming a tropical cyclone unless there is evidence of marked cyclonic banding.
- (2) That satellite pictures giving clear evidence of an eye in addition to positive cyclonic banding be considered sufficient reason to term the tropical cyclone a hurricane.

2.5 Numbering of Tropical Cyclones (USN)

DISCUSSION: The Navy recommended that all tropical cyclones be numbered as soon as detected, numbering consecutively from the beginning of the season, with the number used as a reference in any warnings issued on a tropical cyclone designated as a depression.

RECOMMENDATIONS: That Annex 7 of the Atlantic Hurricane Plan be revised to incorporate the following procedures for numbering tropical cyclones:

- (1) That all tropical cyclones be numbered as soon as detected, numbering consecutively with the first one of the season numbered "one". The number thus assigned to a tropical cyclone termed a depression would be used as the depression number for reference on warnings by the military.
- (2) That the NHC assign numbers to tropical cyclones.

2.6 Present Movement of Storm on Warnings (USN)

DISCUSSION: Navy requested this item be withdrawn.

RECOMMENDATION: Withdrawn.

2.7 Clarification of Atlantic Hurricane Plan (USN)

DISCUSSION: The Navy requested that the first paragraph on Page 2 of the 1966 Atlantic Hurricane Plan be clarified to show who coordinates what with whom.

RECOMMENDATIONS:

- (1) That the first paragraph on Page 2 of the 1966 Atlantic Hurricane Plan be replaced by the following:

"This plan presents the procedures and agreements reached at the annual Interdepartment Hurricane Warning Conference (Atlantic) at the National Hurricane Center, Miami. This conference is sponsored annually by the Sub-committee on Basic Meteorological Services, ICMS, to bring together cognizant Federal agencies to resolve problems of mutual concern related to the Atlantic Hurricane Warning Services."

- (2) That the second paragraph on Page 2 of the 1966 Atlantic Hurricane Plan be replaced by the following:

"The Director, National Hurricane Warning Services (NHWS), Weather Bureau, Miami, Florida, shall provide Air Weather Service and Naval Weather Service designated representatives with the basic meteorological decisions and associated prognostic reasoning concerning location, intensity, and forecast positions of tropical cyclones in the North Atlantic Ocean west of 35 degrees west longitude, the Caribbean Sea, the Gulf of Mexico, and the States and Territories of the United States adjacent to these maritime areas.

The U.S. Weather Bureau shall:

- a. Make the necessary analyses and prepare basic forecasts of tropical cyclones for the use of all Department of Defense interests.
- b. Supply tropical cyclone forecasts to Department of Defense weather services in accordance with published interdepartmental agreements."

2.8 Tropical Cyclones East of 35°W (USAF)

DISCUSSION: The Air Force presented a proposed revision to ANNEX 6.

RECOMMENDATION: That ANNEX 6 of the 1966 Atlantic Hurricane Plan be replaced by the draft ANNEX 6. (See Attachment E)

2.9 Digitized Advisory Information (USAF)

DISCUSSION: The Air Force proposed that NHC add digitized advisory data to the military advisory to provide for automated input into computerized command and control systems. A specific proposal was distributed.

The Navy has no specific requirement but won't object if preparing the digital message does not introduce delays in the advisory.

The Weather Bureau indicated that the workload imposed by additional tropical cyclone discussions would preclude adding the digitized data without degrading either the timing or quality of the advisories. If the military advisory can be shortened or suitable, simple procedures can be developed, the Weather Bureau will try to meet this specialized requirement in 1967.

RECOMMENDATIONS: That The Air Force and Weather Bureau further study the advisory format to determine if the military advisory can be shortened with simple encoding procedures developed so as to allow the NHC to supply the digitized data without degrading the advisory.

2.10 Special Bulletins (WB)

DISCUSSION: The Weather Bureau pointed out that present procedures require a special advisory to lower warnings. This is undesirable because of the extra time involved in preparing and distributing advisories. The Weather Bureau proposes to lower warnings at times other than advisory release times by means of a brief bulletin for public distribution.

CONCLUSION: The Committee concurred with the Weather Bureau proposal.

2.11 Advisory Positions (WB)

DISCUSSION: The Weather Bureau suggested that the wording in the military advisory format (WB Form 656-6) be revised to eliminate the possibility of indicating unfavorable performance of reconnaissance units.

RECOMMENDATIONS: That the wording in the military advisory format (WB Form 656-6) be revised to eliminate the possibility of giving a derogatory connotation to a reconnaissance unit's performance. (See Attachment F)

2.12 Annual Inspection Trip to Caribbean (WB)

DISCUSSION: NHC believes it highly desirable to continue the annual inspection trip and pre-season coordination with foreign countries and islands. This has proved a highly effective mechanism for coordinating use of facilities such as communications, equipment, etc. and for agreeing on procedures prior to the onset of the hurricane season. We strongly believe this program should be maintained and urge that it continue as before.

The Navy concurred with the understanding that the flight should be scheduled during the first week in May 1967 when an aircraft can be made available for 5 days.

RECOMMENDATIONS: A letter should be sent from the Director of the Weather Bureau to Chief of Naval Operations strongly recommending that this trip be activated on an annual basis, citing advantages to be gained to the National Hurricane Warning Service.

2.13 Definition of a Tropical Cyclone (WB)

DISCUSSION: The Weather Bureau proposes that the definition of a "Tropical Cyclone" in ANNEX 8 of the 1966 Atlantic Hurricane Plan be revised as follows:

"A tropical cyclone is a warm core, non-frontal cyclone of synoptic scale dimensions, originating within the tropics or sub-tropics and having a definite organized circulation." This definition eliminates the sub-synoptic scale, short-lived eddies.

The Navy and Air Force suggested that the definition include tropical cyclones that develop over tropical or sub-tropical waters.

RECOMMENDATIONS: Revise ANNEX 8 of the Atlantic Hurricane Plan to include the following definition of "Tropical Cyclone".

TROPICAL CYCLONE: A warm core, non-frontal cyclone of synoptic scale, developing over tropical or sub-tropical waters and having a definite organized circulation.

2.14 New Coordination Procedures (WB)

DISCUSSION: The Weather Bureau proposed that the 1967 Atlantic Hurricane Plan contain information on increased service to the Military Agencies and Weather Bureau Hurricane Warning Office along the following lines:

- (1) A tropical cyclone discussion including preliminary prognostic positions for periods up to 72 hours can be supplied 4 times daily approximately one hour prior to release of the advisory.

The Military Agencies were requested to state their requirements for this information.

The Navy noted that they interpreted this as eliminating inter-agency coordination of forecasts.

The Weather Bureau stated that this was the case.

The Navy and Air Force indicated that they required the preliminary prognostic positions and reasoning 4 times daily prior to release of the advisory.

RECOMMENDATIONS: Revise paragraph 2d of ANNEX 2 to read:

- d. Tropical Cyclone Discussions. The NHC will issue tropical cyclone discussions at 0300Z, 0900Z, 1500Z, and 2100Z daily whenever advisories are being issued. These discussions, with preliminary prognostic positions, will be for intra-government use only and dissemination will be in the same manner as the military advisory.

2.15 Center Fix Times (USN)

DISCUSSION: The Navy stated that the prescribed times for center fixes given in Paragraph 3a of ANNEX 3 should be modified to indicate that first and last light fixes should take priority over synoptic fixes when both are not possible. First and last light fixes are a firm Navy requirement and flights should be planned to also provide for these fixes whenever possible. The Weather Bureau stated that the NHC requirements are for synoptic time fixes as presently specified to provide inputs to prediction techniques and advisory preparation. The Navy stated that it requires sea state and low-level data which can be met only by daylight low-level fixes, and that these can't be compromised by emphasis on synoptic fixes.

The Air Force stated that it recognizes and concurs with the NHC requirements as currently stated.

RECOMMENDATION: That paragraph 3a of ANNEX 3 to the 1966 Atlantic Hurricane Plan be amended by inserting the following statement as the next to last sentence at the bottom of page 9:

"Whenever possible, flights should be planned to provide first and last light fixes in addition to synoptic time fixes."

2.16 Weather Observing Capability - Air Force Eastern Test Range (USAF)

DISCUSSION: The Air Force presented the attached paper describing its weather observing capability at its Eastern Test Range stations.

CONCLUSION: The Air Force paper was noted. (See Attachment G)

3. COMMUNICATIONS

3.1 Recommended Ground Stations for Pilot-Controller Communications (FAA)

DISCUSSION: Gull Bravo Aircraft have requirement for drop-sonde in New York area. If working Andrews, New York Center has direct center pilot communications. Aircraft working MacDill or Miami do not have direct pilot center controller contact.

RECOMMENDATION: For ATC reporting and Drop-sonde clearance recommend that aircraft in New York OAC work (1.) Andrews Airways or (2.) AIRINC SO DIRECT PHONE PATCH CAN BE MADE TO New York Center. In event MacDill is utilized a delay in Position/Clearance can be anticipated. Aircraft are requested to work ground stations in center area concerned.

3.2 Airspace Reservations (FAA)

DISCUSSION: Believed to be a "Storm Fury" item.

CONCLUSION: Item withdrawn.

3.3 MARSA Concept for ESSA Aircraft (FAA)

DISCUSSION: ESSA assumes responsibility for separation of ESSA Aircraft engaged in ESSA reconnaissance and research operations. This does not include joint military ESSA operations at this time.

RECOMMENDATION: This item is referred to ESSA/FAA discussions regarding "Storm Fury" operations.

3.4 Identical Names of Hurricane Reconnaissance (FAA)

DISCUSSION: A change in Synoptic Reconnaissance tracks was not apparent with the result two tracks had the same name; Gull Alpha.

RECOMMENDATION: As much advance notice as possible will be given FAA on changes in Synoptic Reconnaissance tracks. Tracks will be forwarded in pictorial form to centers two weeks in advance. Subsequent track changes will bear the same phonetic alphabetical names, with an additional numerical suffix.

3.5 Relay of ATC Clearances, Progress Reports or Search and Rescue Messages (FAA)

DISCUSSION: The direct center/pilot communications available on SSB now installed in centers will provide an additional communication channel to Miami, Jacksonville and San Juan Centers.

RECOMMENDATION: In 1967 Atlantic Hurricane Plan Annex 3 Paragraph 6, Page 14 show U.S.N., SSB 6723 kcs (primary) 4711 kcs (secondary) as number one, list others accordingly. This should resolve communications problems as outlined in agenda item.

3.6 HF SSB Backup (USAF)

DISCUSSION: Fleet Weather Facility SSB Circuits used for meteorological data does not have phone patch capability.

CONCLUSION: Navy has taken steps to install phone patch capability at Fleet Weather Facility, Jacksonville, Florida.

3.7 Relocation of USAF Recon Monitor (USAF)

Item noted by Conference.

ATTACHMENT A

AIR FORCE RESOURCES (1967)

1. Air Force has the resources outlined in the 1964 JCS paper to perform storm reconnaissance for the National Hurricane Center as requested. Resources are as listed:

- a. Five WC-130 aircraft/530 flying hours/mo.
- b. In addition, six WB-47 aircraft/120 hours/mo. can be devoted to the high altitude peripheral reconnaissance.

2. WC-130 aircraft are equipped with the following navigation, communications, and meteorological equipment.

VHF-101	VHF Command
AN/ARC-39	UHF Command
Collins 618T	SSB HF Radio
AN/APN-59	Radio Set
AN/APN-70	Loran
AN/APN-147	Doppler
SCR-718F	Radio Altimeter
Rosemont Total Temp Probe	Temperature Ind.
AN/AMT-6	Dropsonde

3. Crewmembers for a WC-130 aircraft are:

Aircraft Commander	Navigator
Copilot	Weather Officer
Weather Observer	Engineer

4. With WC-130 resources cited above, the Air Force has the capability to perform four storm fixes/day, two per aircraft, with the spurt capability of providing eight fixes per day if two storms require reconnaissance. Additionally the WB-47s can supply peripheral data at 300 and 200 mb. as requested by NHC at the storm reconnaissance conference held in Miami during July 1965. While not engaged in storm reconnaissance, the capability exists to fly two synoptic tracks the same as or similar to the Gull India flown during 1966, one track with the WB-47 and one with a WC-130.

ATTACHMENT B

NAVY MISSION, ROLES, EQUIPMENT AND AIRCRAFT CAPABILITIES
OF VW-4 FOR 1967

The primary mission of VW-4, during the forthcoming hurricane season, will be the same as in the past - Support Hurricane Reconnaissance. Our role, as in the past, is long range low level reconnaissance, with primary emphasis on our speciality, low level hurricane penetration below 1,000 feet.

Our equipment capabilities have been increased since last season. We now have all aircraft completely operational in the Four Beam doppler navigation system, APN 153, and the supporting computer ASN41. This navigation system should upgrade the validity (questioned) of our storm/hurricane fixes. We also have a new radar alt. (APN 159), accurate to ± 10 feet at 10,000 operational in all aircraft. We have expended considerable effort this winter in updating and getting all of our equipment completely operational in order to better support Hurricane Reconnaissance, accurately, and with increased safety of flight.

Worthy of mention in potential equipments would be the new data acquisition system which we will evaluate this season in our prototype aircraft. This system is currently being installed at China Lake and will be completed about 15 February. This data acquisition system will collect all metro and navigation perimeters, store, display or feed directly to an automatic transmitting device - if you may - a possible transition from the Pencil Age to the Computer Age in Recon Weather Observation.

Our total aircraft resources have been reduced from 8 aircraft to 6 aircraft, and operational crews from 7 to 5, but no planned reduction in support of hurricane reconnaissance services is contemplated. This reduction in total aircraft has given VW-4 a more realistic maintenance capability per aircraft than we had last season. Additionally, all 6 of our aircraft will have completed, by 15 June, the new progressive maintenance contract negotiated with Lockheed last fall - we believe this will give us a better maintained and safer reconnaissance platform than we had in previous seasons.

In summary: Our support of hurricane reconnaissance remains primary as in past seasons - although our reduction in total aircraft may at times effect our flexibility - our new equipment, upgrading of current equipment and a more realistic maintenance ratio per aircraft, should give VW-4 a more reliable and safer low level recon platform for the forthcoming Hurricane Season.

ATTACHMENT C

ESSA/RFF

In 1966 during the period 1 July through 15 November, the ESSA/RFF flew a total of 310 research hours in support of the NHRL and in conjunction with the research mission provided the following reconnaissance data: 44 Storm Center Fixes, made 71 eye penetrations, 27 dropsondes and transmitted 278 Recco Messages.

In 1967 ESSA/RFF will have four aircraft available for hurricane research, 2 DC-6's, 1 B-57 and 1 C-54.

The flight hour capability is as follows:

DC-6	100 Flt. Hrs./Month
DC-6	100 Flt. Hrs./Month
C-54	100 Flt. Hrs./Month
WB-57	50 Flt. Hrs./Month
<hr/>	
Total	350 Flt. Hrs./Month

ATTACHMENT D

ESSA SATELLITES - OPERATIONAL DURING HURRICANE SEASON 1967

1. Automatic Picture Transmission

ESSA IV - Equator crossing 10:00 to 10:30 AM Southbound
ESSA II - Equator crossing 7:00 AM Southbound

2. Advanced Vidicon Camera System (AVCS) - stored data, global coverage will supply information for neph analyses and digital data (mozaic) which will be available on facsimile circuits.

ESSA III- Equator crossing 1:00 PM Northbound
ESSA V - Equator crossing 3:00 PM Northbound - planned launch
in May

This will provide four looks per day of the tropical region if all systems operating.

There are no plans for ATS synchronous satellite over the Atlantic this season.

Property of
NOAA Miami Library
3301 Rickenbacker Causeway
Miami, Florida 33149

ATTACHMENT E

RECOMMENDED ANNEX 6 TO ATLANTIC HURRICANE PLAN

PROCEDURES AND ISSUING TROPICAL CYCLONE ADVISORIES
AND WARNINGS EAST OF 35° LONGITUDE

1. When named tropical cyclones cross 35°W longitude from west to east, the Weather Bureau ceases to issue formal public advisories. However, the Weather Bureau continues to issue marine bulletins on tropical storms and hurricanes after they pass eastward of longitude 35°W as long as they are of importance to merchant shipping in the eastern North Atlantic. These bulletins are included in Weather Bureau Marine Bulletins broadcast to ships 4 times daily via Radio Station NSS, Washington, D.C. Similarly, the Weather Bureau issues bulletins of named tropical cyclones in progress when they are east of longitude 35°W in the North Atlantic but moving westward. These are included in the Weather Bureau shipping bulletins broadcast to merchant ships via Radio Station NSS.

2. The responsibilities for issuing warnings for interests in the Eastern North Atlantic rests with the Fleet Weather Central Rota for the Navy, with Det. 11, 21 Weather Squadron, Torrejon Air Base, for the Air Force and Army. However, warnings issued by the Fleet Weather Central Rota will satisfy Air Force and Army requirements in the Azores, European and North African areas. When tropical cyclones exist east of 35°W, the Fleet Weather Central, using pertinent portions of the Atlantic Hurricane Plan, will pass warnings directly to Det. 11., 21 Weather Squadron, for further relay to other Air Force and Army installations in the Azores, Europe and North Africa.

3. When a tropical cyclone develops or is first detected east of 35°W, which is of storm intensity or is expected to reach storm intensity, the Fleet Weather Central, Rota, will request the OIC, FWF, Jacksonville to arrange with NHC for the assignment of a name to this tropical cyclone.

4. NHC, Miami, Fla., WBFC, Washington, D.C., and WBAS, San Juan, P.R., will be included among the addressees of warnings issued by FWC, Rota, for tropical cyclones in the Atlantic east of 35°W.

5. Letters of the alphabet will be used in lieu of numbers to identify the sequence of un-named tropical cyclones in warnings issued by FWC, Rota, i.e., the first un-named tropical cyclone will be Alfa, the second Bravo, etc. Numbers will be used to identify the sequence of named tropical cyclone warnings issued by FWC, Rota. The numbers will be part of the same sequence used to identify the tropical cyclone advisories issued by the U.S. Weather Bureau. The first advisory following the transfer of responsibility from one center to another across latitude 35°W shall contain a brief paragraph reflecting past history of the storm.

6. A statement will be included in the last warning on a tropical cyclone in the eastern North Atlantic issued by FWC, Rota, indicating the status of the cyclone, e.g., that it is dissipating or that it is about to cross the 35th meridian. Any future warnings and/or bulletins will then be issued by FWF, Jacksonville, and NHC, Miami.

WB FORM 656-6
2-67

ATTACHMENT F

U. S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
Weather Bureau

ESSA WEATHER BUREAU MARINE/ AVIATION/ MILITARY ADVISORY NUMBER _____

TROPICAL DEPRESSION
TROPICAL STORM
HURRICANE

Z _____
(NAME) (MONTH) (DAY) (YEAR)

(WARNINGS)

DEPRESSION/STORM/HURRICANE CENTER LOCATED NEAR LATITUDE _____ NORTH LONGITUDE _____ WEST

AT _____ / _____ Z. POSITION GOOD/FAIR BASED ON AIR FORCE/NAVY/ESSA RECONNAISSANCE _____

LAND BASED RADAR _____ SATELLITE _____ SHIP/PERIPHERAL SHIP/ SYNOPTIC REPORTS .

POSITION POOR _____

PRESENT MOVEMENT TOWARD THE _____ OR _____ DEGREES AT _____ KT.

PRESENT WIND DISTRIBUTION

MAXIMUM WINDS OF _____ KT NEAR CENTER _____

RADIUS OF 65 KT WINDS _____

RADIUS OF 50 KT WINDS _____

RADIUS OF 30 KT WINDS _____

FORECASTS

12 HOURS VALID _____ / _____ Z LATITUDE _____ NORTH LONGITUDE _____ WEST. MAXIMUM WINDS OF _____ KT NEAR CENTER _____

50 KT WINDS _____

24 HOURS VALID _____ / _____ Z LATITUDE _____ NORTH LONGITUDE _____ WEST. MAXIMUM WINDS OF _____ KT NEAR CENTER _____

50 KT WINDS _____

(MARINE AVIATION ADVISORY NORMALLY ENDS HERE) (PLUS LAST PARAGRAPH)

STORM SURGE OF _____

HEAVY PRECIPITATION _____

EXTENDED OUTLOOKS

48 HOURS VALID _____ / _____ Z LATITUDE _____ NORTH LONGITUDE _____ WEST. MAXIMUM WINDS _____ KT.

50 KT WINDS WITHIN _____ MILES OF THE CENTER.

72 HOURS VALID _____ / _____ Z LATITUDE _____ NORTH LONGITUDE _____ WEST. MAXIMUM WINDS _____ KT.

NEXT ADVISORY AT _____ / _____ Z.

ATTACHMENT G

WEATHER OBSERVING CAPABILITY

AIR FORCE EASTERN TEST RANGE (AFETR)

AFETR Weather Stations are presently operational at Cape Kennedy, Florida, Grand Bahama, Eleuthera, Grand Turk, Antigua and Ascension Island. In addition, three Range Instrumentation Ships have operational weather stations on board. The ships operate at various locations as needed.

Summaries of the ETR surface and rawinsonde observation schedules are provided in Appendix A. Special observations will be provided to the National Hurricane Center upon request of the CARCAH.

Meteorological rocket observations are made 5 days per week at Cape Kennedy and 3 days per week at Antigua. These rockets are fired in support of the Meteorological Rocket Network and to support missile tests. Rocket data are available to 200K feet.

All rawinsonde and meteorological rocket data are processed in a central computer facility located at Cape Kennedy. In addition to the complete rawinsonde transmissions, this unit transmits UZ wind data to NHC for each rawinsonde observation taken during the hurricane season. Other special computer support is also available upon request.

Radar tracking support is provided to the National Hurricane Center on a routine and special basis from Cape Kennedy, Florida and Grand Turk Island. Radars providing this support are SCR 584-Mod II type. These radars normally report routinely three times per day but may be placed on any reasonable schedule requested by the CARCAH.

WEATHER OBSERVATION SCHEDULES

"Appendix A"

A. SURFACE OBSERVATIONS

STATION	Greenwich Mean Time																							
	00Z	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23Z
CKAFS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
*GBI	X																							
*ELU	X																							
*GTK	X																							
*ANT	X																							
SHIPS	X																							

X: Provided routinely 7 days per week
 +: Provided routinely 5 days per week (Monday through Friday)
 *: Temperature, relative humidity, pressure, wind speed and wind direction will be provided at hourly intervals from automatic observing equipment beginning 1 April 1967.

B. RAWINSONDE OBSERVATIONS

STATION	Release Time	Greenwich Mean Time																						
		*UZ Wind Data Available for:																						
	0000Z	1200Z																						
CKAFS	2315Z	1400Z																						
CBI	2315Z	1400Z																						
ELU	---	---																						
GTK	---	---																						
ANT	---	---																						

*NOTE: Data will be transmitted to NHC during earlier free time if available.

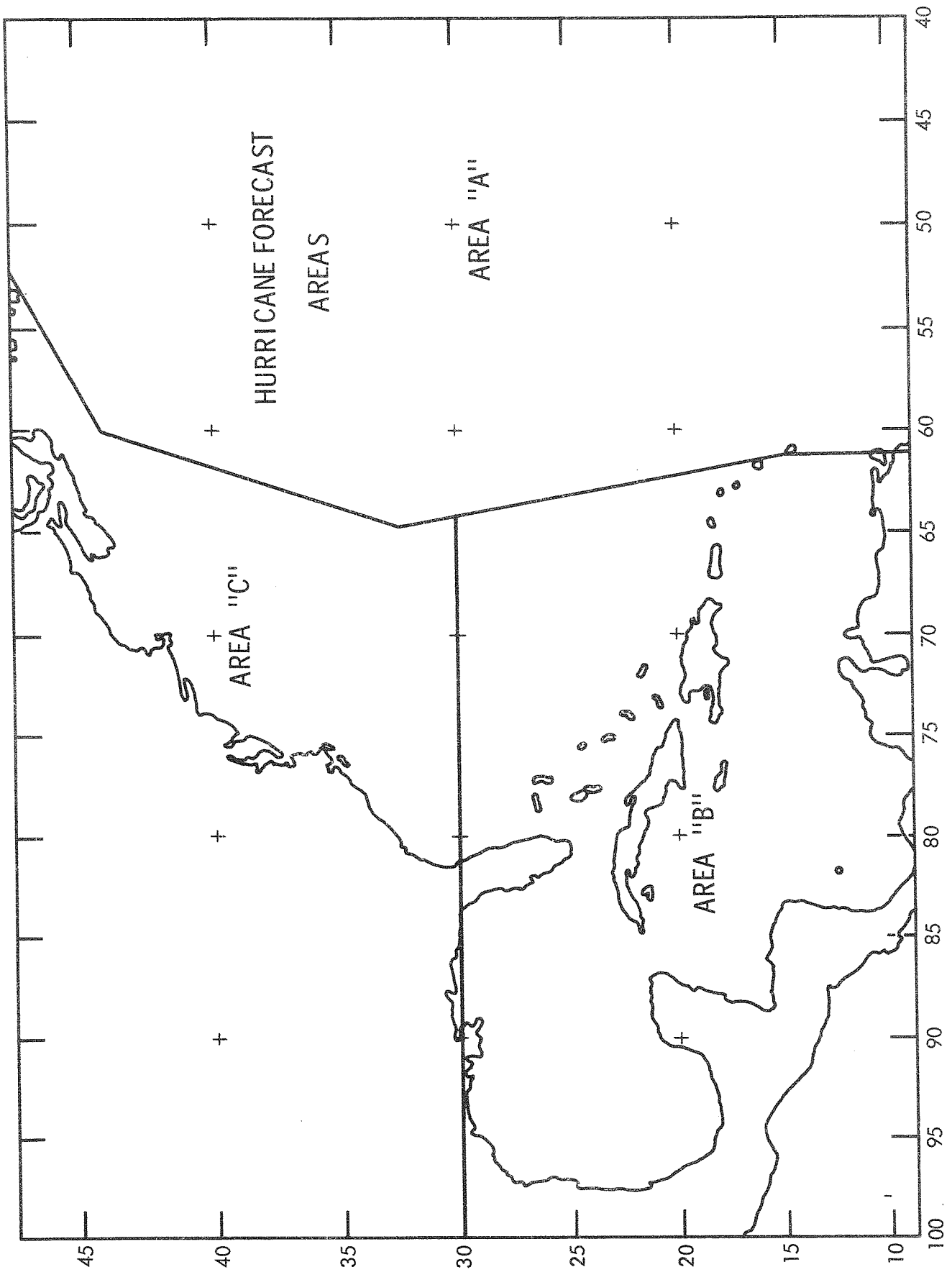


Figure 2

OFFICIAL 24-HOUR WEATHER BUREAU FORECASTS — BY AREAS
1964 — 1966

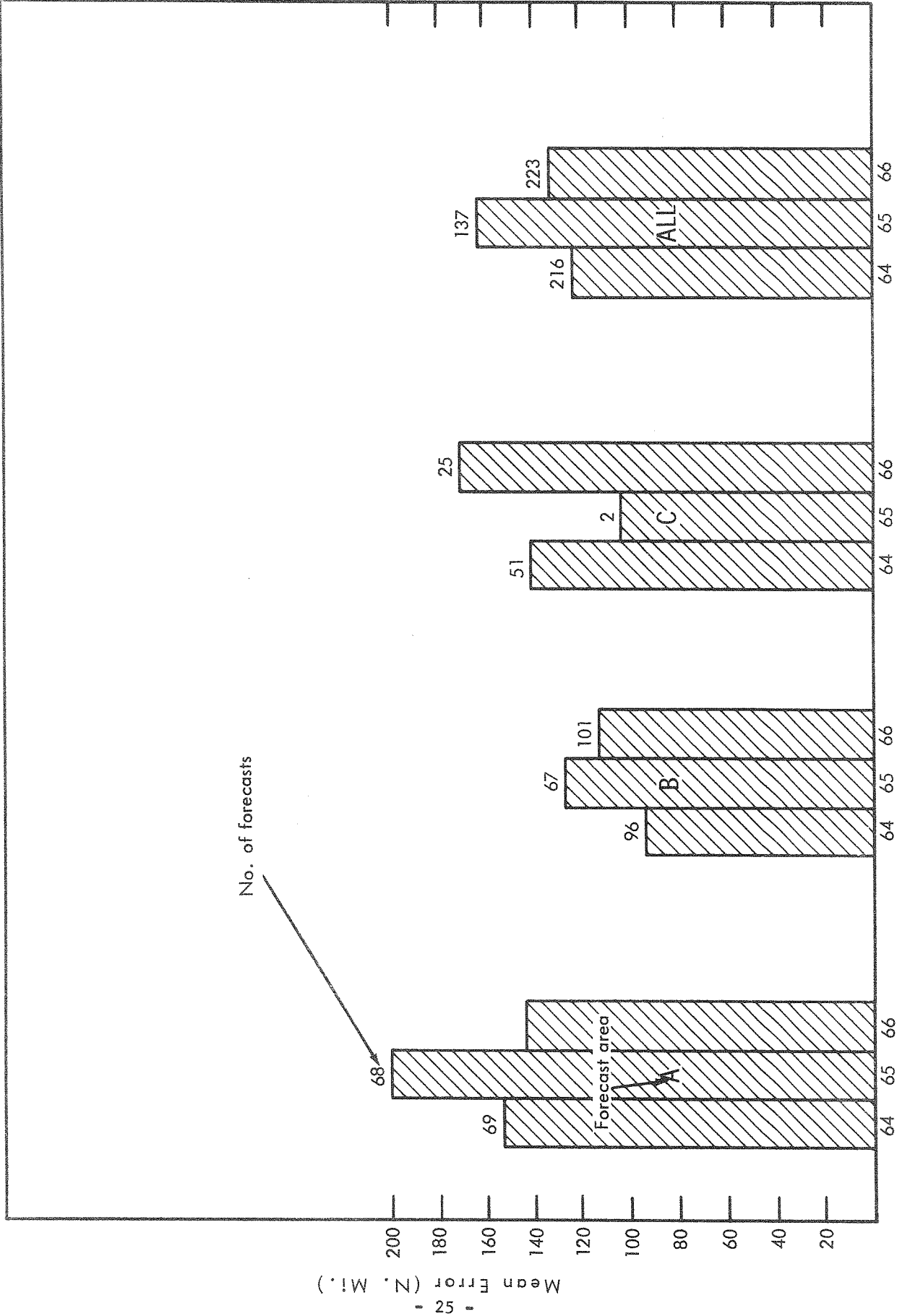


Figure 2

OFFICIAL 48-HOUR WEATHER BUREAU FORECAST - BY AREAS
1964 - 1966

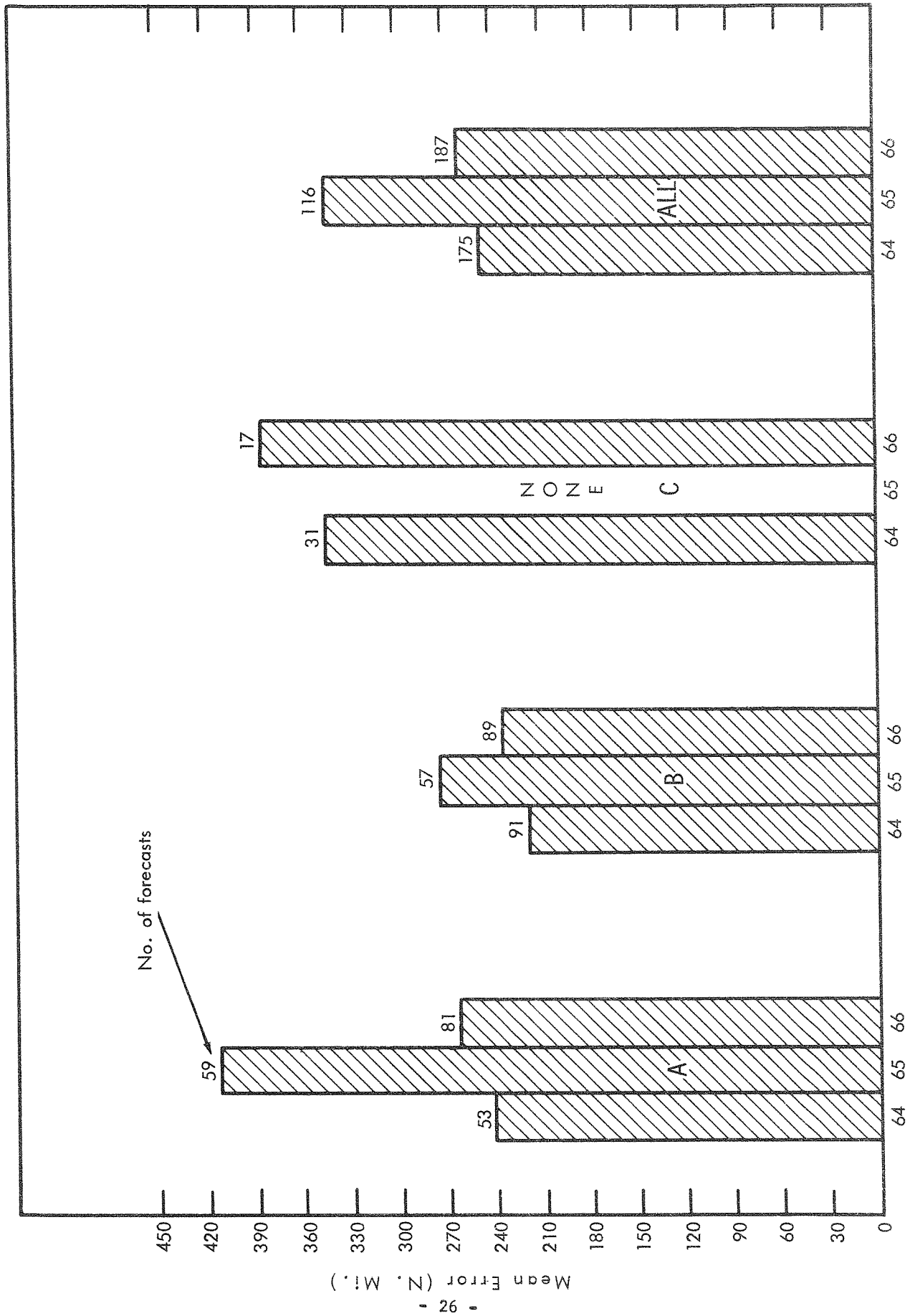


Figure 3

OFFICIAL 72-HOUR WEATHER BUREAU FORECASTS — BY AREAS
1964 — 1966

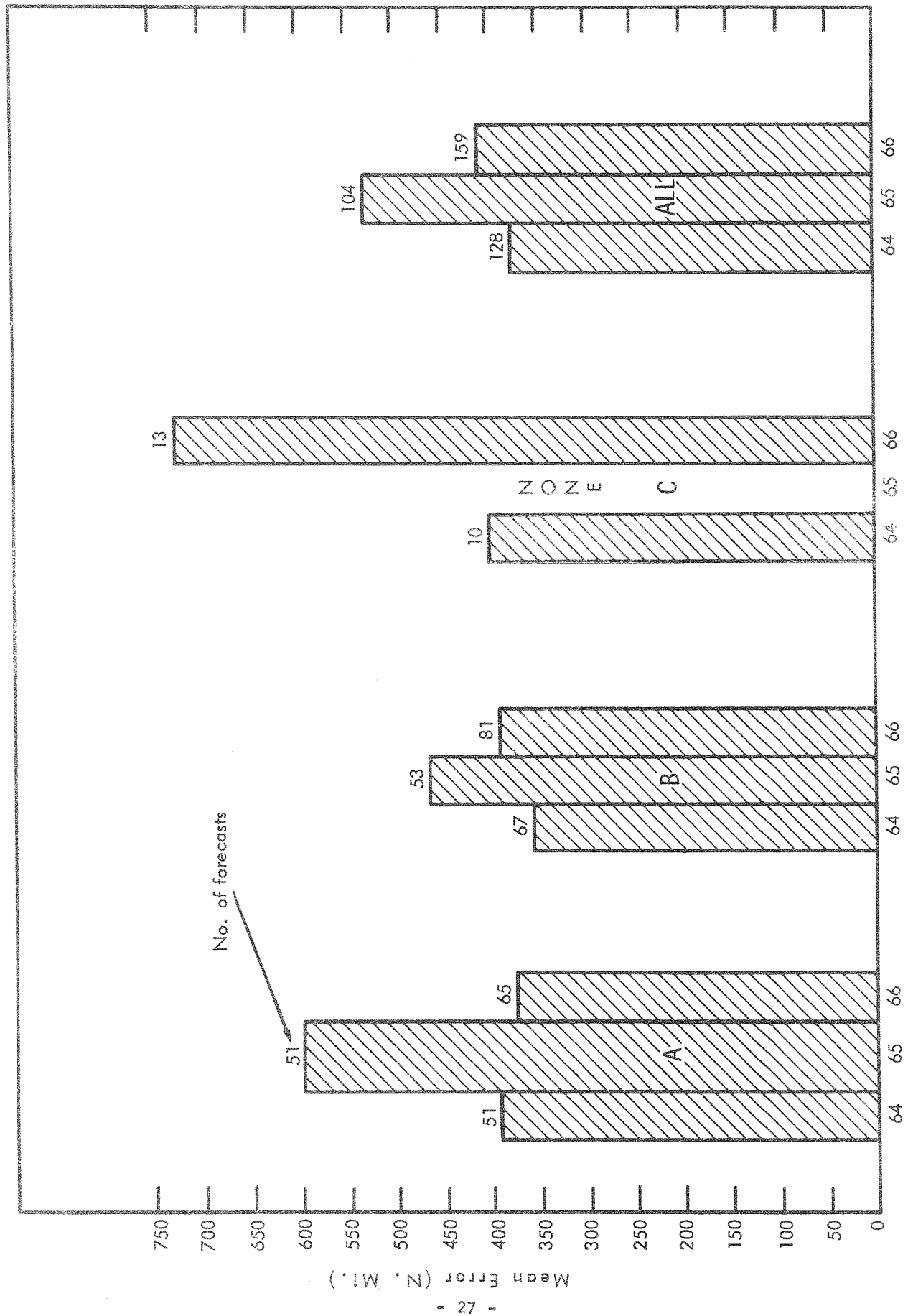


Figure 4

HOMOGENEOUS 24-HOUR FORECASTS FOR THE NHC-64, NWP, PERS,
 * AND "ADJUSTED OFFICIAL WEATHER BUREAU FORECAST" TECHNIQUES-
 BY AREAS FOR 1966

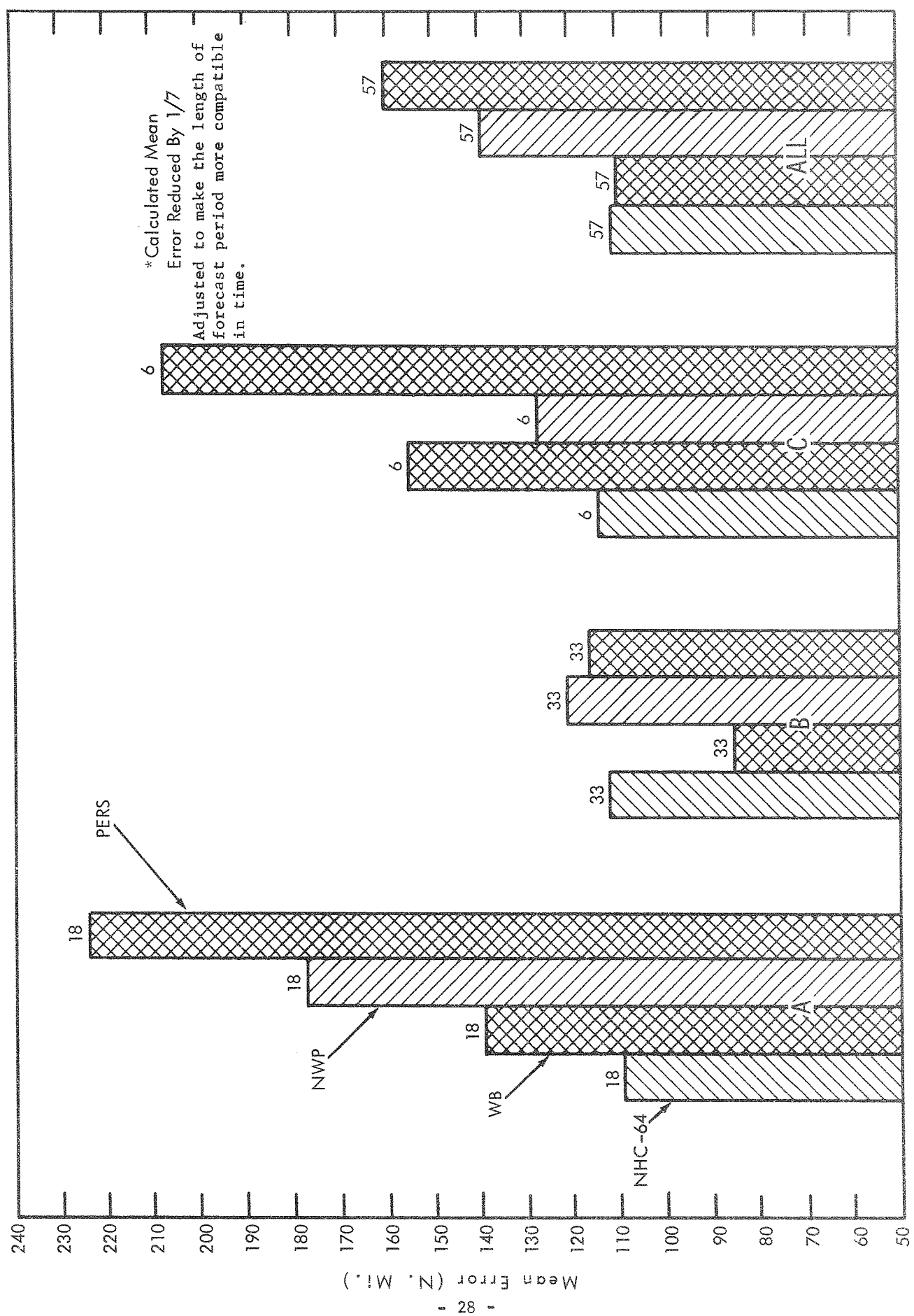


Figure 5

HOMOGENEOUS 48-HOUR FORECAST FOR THE NHC-64, NWP, PERS,
 *ADJUSTED OFFICIAL WEATHER BUREAU FORECASTS TECHNIQUES-BY
 AREAS 1966

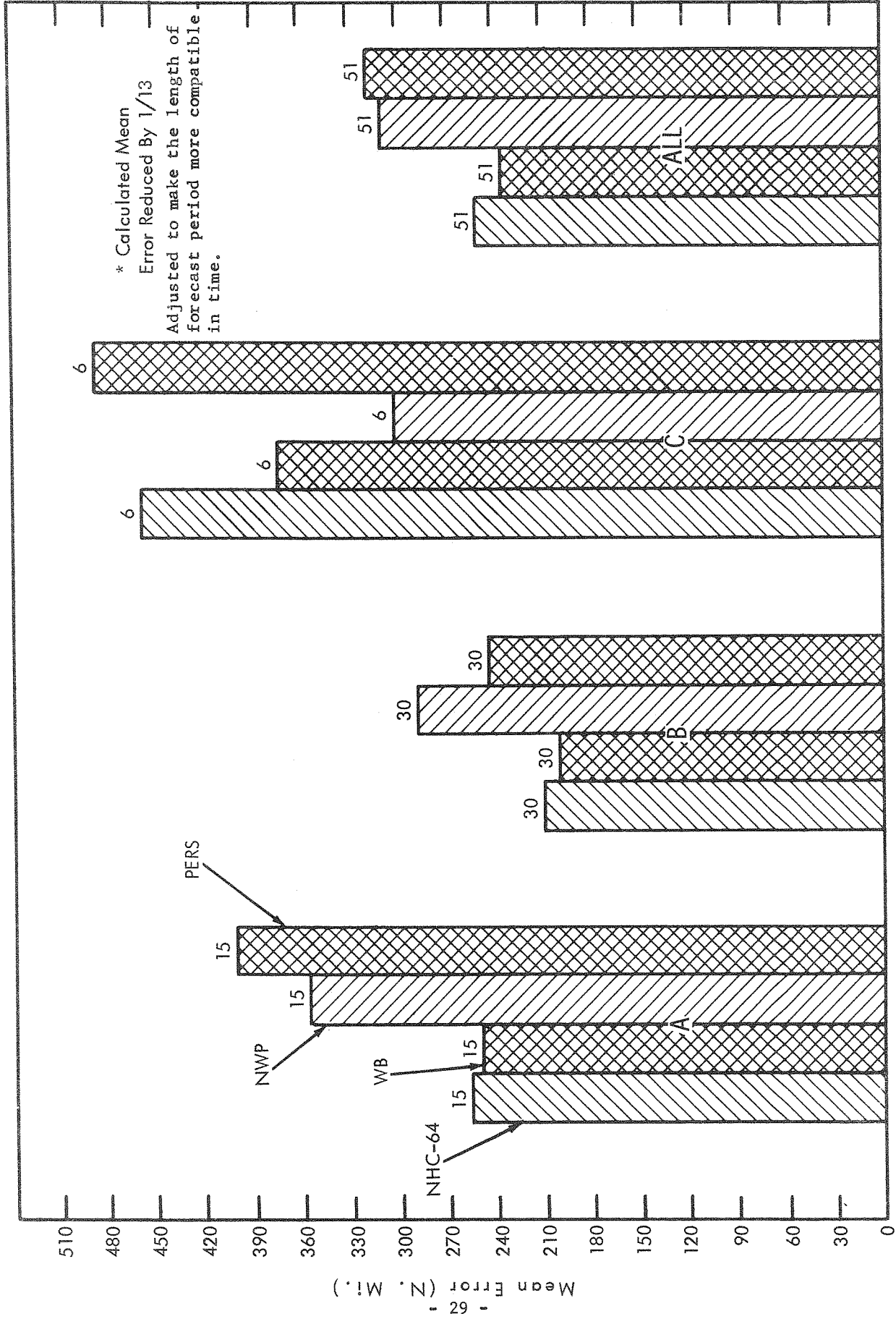


Figure 6

HOMOGENEOUS 72-HOUR FORECASTS FOR THE NHC-64, NWP AND
 *ADJUSTED OFFICIAL WEATHER BUREAU FORECASTS TECHNIQUES --
 BY AREAS 1966

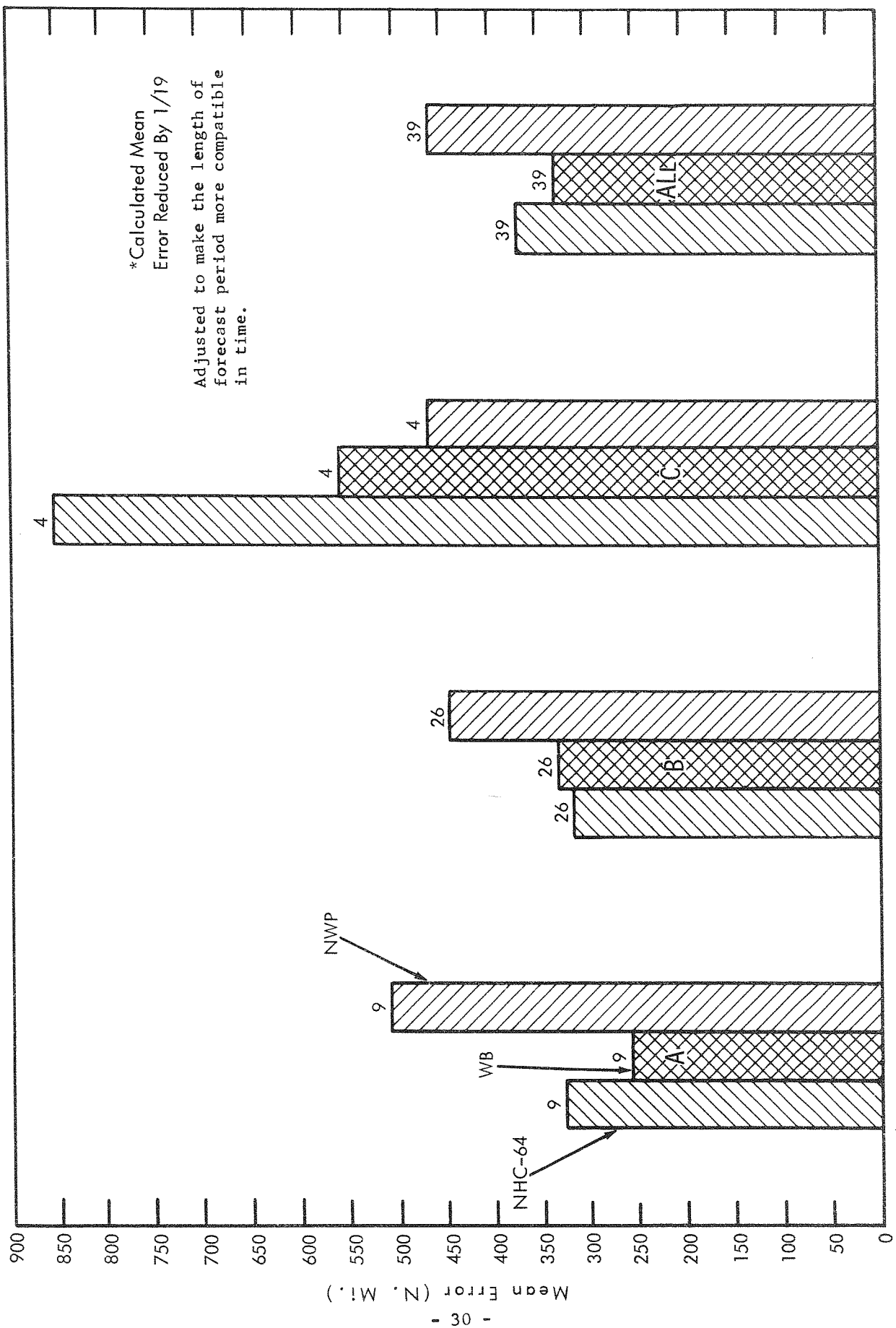


Figure 7

OFFICIAL 24-HOUR WEATHER BUREAU FORECASTS
1956 - 1958

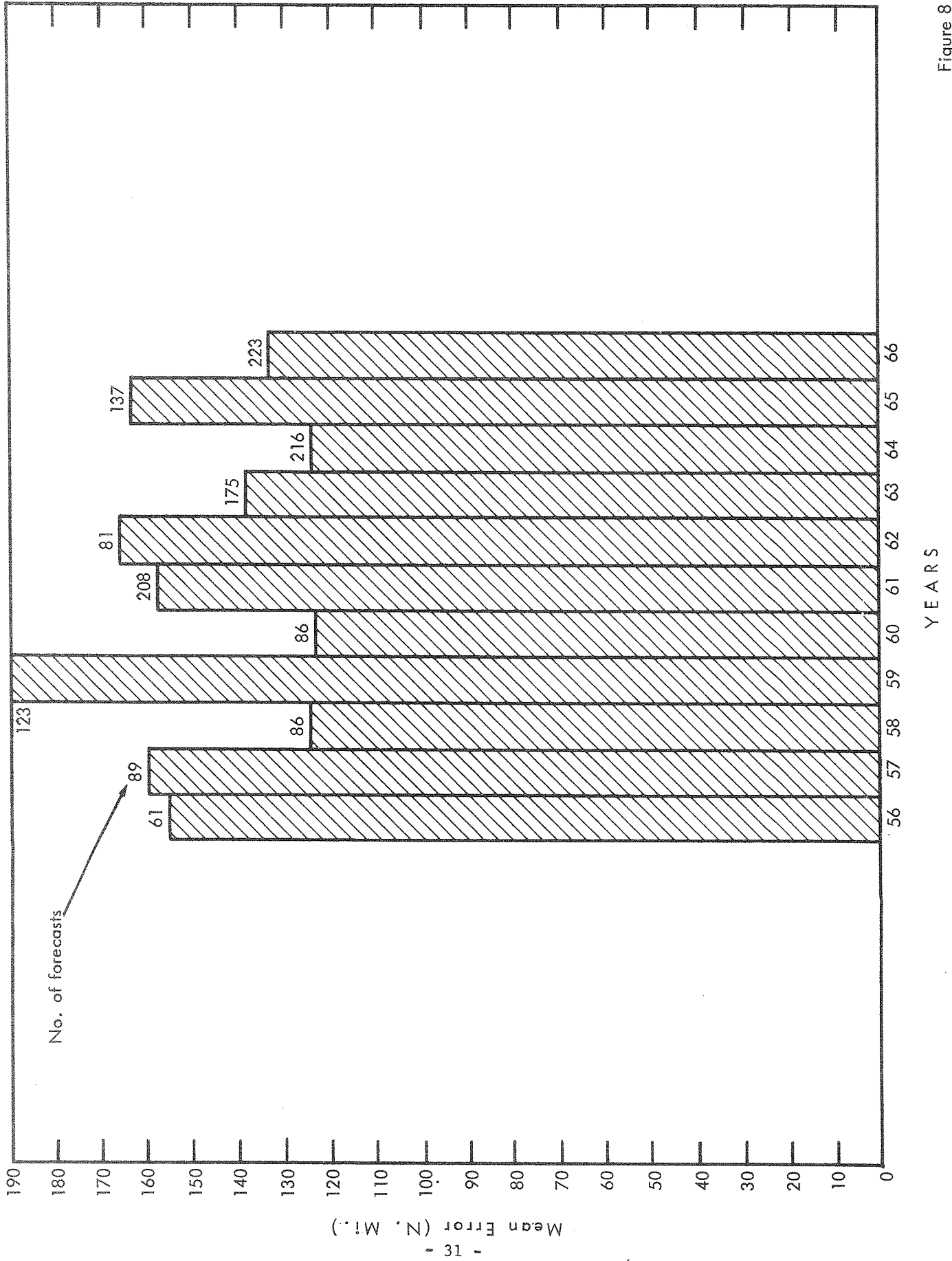


Figure 8

NOTE: In the following Tables 1 through 4, forecasts were not made at the same time on each storm by all these methods.

- a. Reference time of WB Fcsts: 04Z, 10Z, 16Z, 22Z
- b. " " " NHC-64, NWP: 00Z & 12Z
- c. " " " PERS: 00Z, 06Z, 12Z, 18Z

TABLE 1
"12 HOUR FORECAST PERIOD"

1966

AREA	NAME OF TECHNIQUE	NO. OF FCSTS	MEAN (N.MI.)	STANDARD DEVIATION (N.MI.)	MEDIAN (N.MI.)	LOWER QUARTILE (N.MI.)	UPPER QUARTILE (N.MI.)	RANGE (N.MI.)
A	WB	102	85	65	67	42	95	11-376
	NHC-64	36	90	59	82	44	113	13-264
	NWP	25	90	56	66	52	129	18-252
	PERS	100	112	82	89	65	134	8-517
B	WB	106	58	36	49	29	77	6-178
	NHC-64	43	63	27	56	39	84	8-121
	NWP	35	55	35	50	23	74	6-165
	PERS	107	59	39	50	29	80	6-199
C	WB	28	84	53	69	43	119	19-200
	NHC-64	13	64	33	49	37	85	26-143
	NWP	8	75	30	74	40	83	35-140
	PERS	29	82	45	68	50	126	6-161
ALL	WB	236	73	54	59	36	90	6-376
	NHC-64	92	74	45	60	43	98	8-264
	NWP	68	70	46	58	38	88	6-252
	PERS	236	84	66	72	38	108	6-517

TABLE 2
 "24 HOUR FORECAST POSITION"

1966

AREA	NAME OF TECHNIQUE	NO. OF FCSTS	MEAN (N.MI.)	STANDARD DEVIATION (N.MI.)	MEDIAN (N.MI.)	LOWER QUARTILE (N.MI.)	UPPER QUARTILE (N.MI.)	RANGE (N.MI.)
A	WB	97	143	99	112	80	169	25-529
	NHC-64	34	125	90	110	63	152	15-443
	NWP	24	180	115	168	82	252	6-404
	PERS	96	187	127	153	92	229	10-654
B	WB	101	113	66	105	59	153	12-300
	NHC-64	42	119	63	100	70	161	28-263
	NWP	35	129	64	120	72	148	31-278
	PERS	101	129	92	106	73	160	8-652
C	WB	25	171	84	169	112	208	42-441
	NHC-64	12	126	82	140	31	194	6-229
	NWP	8	155	65	151	78	200	61-243
	PERS	25	182	98	181	102	246	5-427
ALL	WB	223	133	86	110	71	170	12-529
	NHC-64	88	122	77	107	65	169	6-443
	NWP	67	151	89	129	77	199	6-404
	PERS	222	160	113	131	82	210	5-654

TABLE 3
 "48 HOUR FORECAST PERIOD"

1966

AREA	NAME OF TECHNIQUE	NO. OF FCSTS	MEAN (N.MI.)	STANDARD DEVIATION (N.MI.)	MEDIAN (N.MI.)	LOWER QUARTILE (N.MI.)	UPPER QUARTILE (N.MI.)	RANGE (N.MI.)
A	WB	81	264	164	231	149	317	44-816
	NHC-64	31	266	148	263	123	360	52-605
	NWP	19	373	257	289	138	537	77-935
	PERS	80	359	250	276	190	411	88-1271
B	WB	89	235	140	207	110	325	13-650
	NHC-64	39	209	124	184	117	265	27-493
	NWP	32	299	151	285	189	337	85-760
	PERS	89	257	152	203	144	357	13-711
C	WB	17	386	179	435	206	507	60-650
	NHC-64	8	460	117	466	375	522	229-637
	NWP	6	302	170	335	88	423	87-524
	PERS	18	483	316	435	285	526	173-1660
ALL	WB	187	261	160	231	140	338	13-816
	NHC-64	78	257	152	236	128	369	27-637
	NWP	57	324	198	286	158	427	77-935
	PERS	187	323	229	264	169	411	13-1660

TABLE 4
 "72 HOUR FORECAST PERIOD"

1966

AREA	NAME OF TECHNIQUE	NO. OF FCSTS	MEAN (N.MI.)	STANDARD DEVIATION (N.MI.)	MEDIAN (N.MI.)	LOWER QUARTILE (N.MI.)	UPPER QUARTILE (N.MI.)	RANGE (N.MI.)
A	WB	65	376	180	341	245	450	130-1189
	NHC-64	21	377	217	312	192	475	89-859
	NWP	13	602	509	361	151	781	116-1626
	PERS	64	508	351	385	267	634	27-1700
B	WB	81	394	251	322	221	491	71-1133
	NHC-64	30	346	193	321	167	462	64-711
	NWP	30	483	206	451	332	586	192-1159
	PERS	81	441	264	417	242	583	6-1219
C	WB	13	729	276	828	453	912	109-1099
	NHC-64	4	855	---	861	740	923	740-960
	NWP	5	533	---	570	268	689	249-791
	PERS	13	675	312	485	414	887	273-1232
ALL	WB	159	414	246	358	244	502	71-1189
	NHC-64	55	395	236	326	177	583	64-960
	NWP	48	521	323	451	297	627	116-1626
	PERS	158	487	312	412	264	635	6-1700

TABLE 5

Comparison of Official ESSA (WB)
Forecasts and Persistence

Year	Average Error Official ESSA(WB) Forecast (n.mi.)	Average Error Persistence (n.mi.)	Number of Forecasts	S _p Score* $\frac{P-O}{P}$
1955- 1958	131	164	375	.201
1959	193	217	104	.111
1960	117	128	77	.086
1961	159	199	214	.201
1962	164	221	81	.258
1963	137	173	169	.208
1964	125	161	206	.224
1965	163	210	132	.224
1966	132	160	222	.175

* S_p Score is the "Skill" Score.

P is the Average Error of the Persistence Forecast.

O is the Average Error of the Official ESSA(WB) Forecast.